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Some Experiences with Gastro-duodenal Lesions

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Introduction.

The controversy whether the lesion of the gastro-duodenal tract, should be treated by the Surgeon's knife, or the Physician's drugs, is not yet over and the physician is as ready with his statistics of drug cures, as the surgeon with his cures by operation. However, the physician has not so far claimed cancer of the stomach, or obstruction of the pylorus, as his preserves and left them to the surgeon to deal with.

The lesions of the gastro-duodenal tract, that come to the surgeon are mainly duodenal ulcer, pyloric ulcer, pyloric obstruction due to an old ulcer, gastric ulcer, hour-glass stomach, leather bottle stomach, syphilitic stomach and gastric carcinoma. Many a time subacute duodenitis and chronic gastritis come to the surgeon as suspicious cases of duodenal or gastric ulceration.

The majority of these cases, one finds, are of long duration, varying from three to twenty years. Patients first try every variety of medical treatment and when no relief is found then only come to the surgeon. One comes across good many cases where death has occurred by inanition due to pyloric obstruction of a long duration or due to haemorrhage from a gastric or duodenal ulcer. I am aware of at least a dozen people who are showing all the symptoms of pyloric ulcer with obstruction but are refusing operation and leading a life of starvation. No doubt the number of persons seeking surgical help for such complaints is much more than some years ago and is increasing day by day.

Genesis and Morbid Anatomy.

Peptic ulcer. The sites for peptic ulcer are terminal portion of the oesophagus, and in the stomach the posterior surface, the lesser curvature near the pylorus and proximal portion of duodenum. A gastric ulcer is very rarely within an inch and a half or more from the pylorus according to Moynihan. It is deep and involves the serosa. Cicatrization and contraction follow proliferation of granulation tissue. So adhesions may form on the all-bladder, pancreas and small intestine.

The following theories are put forward as regards the etiology of gastric ulcer :—

(*a*) *Autodigestion.* There is inherent in the gastric mucosa a resistance to the digestive action of its own secretion. A single round area may lose its resistance to gastric juice and be the starting place of gastric ulcer.

(*b*) *Lymphangitis and lack of infolding of mucosa.* As a result of lymphangitis and arteritis the nutrition of tissues forming the border of the ulcer is depressed and ulcer extends. Lymphatic tissue is most abundant near the pylorus. Contraction of the walls and infolding of the gastric mucosa take place to a limited degree between pars pylorica and lesser curvature where ulcer is most common.

(*c*) *Internal secretion.* Disturbance of internal secretion inhibits the focal production of antipepsin and gives rise to cytotoxic substances.

(*d*) *Nervous and Neuropathic influences.* Dermatitis multiformis which is related to the nervous system may cause gastric ulcer. Injury to the vagus below the diaphragm is followed by ulcer. Ulcer has been formed in animals by the hypodermic injection of pilocarpine and physostigmine. Atropine which inhibits the vagus should occupy a more important place in the treatment and prevention of ulcer.

Duodenal Ulcer. According to Moynihan an ulcer is either gastric or duodenal. There is no special ulcer either pyloric or juxtapyloric. A duodenal ulcer is almost always half an inch or more from the pyloric opening. "A pyloric stenosis is really duodenal stenosis."

In addition to the causes given above the following are believed to be some of the causes which contribute to the formation of duodenal ulcer. (*i*) A terminal branch of the hepatic artery without any connection supplies the first part of the duodenum. Any pathological condition which causes thrombosis of the terminal branch will bring on necrosis of the portion of the duodenum supplied by it thus forming the basis of an ulcer. (*ii*) *Acid Chyme*—On opening of the pyloric sphincter, acid chyme constantly squirts on the anterior wall of the first part of the duodenum thus irritating it and causing ulceration.

Clinical Course and Symptoms.

In gastric ulcer the main symptoms are painful dyspepsia, vomiting, localized pain and tenderness and hyperchlorhydria. History of haemorrhage may be present. Irritative dyspepsia preceding gastric ulcer has more definite beginning than other dyspepsias. It is made worse by slight dietetic indiscretion. There is evidence of over-sensitiveness of the pylorus as distress appears some hours after eating. Pain appears after taking food and lasts for an hour or two. There is tenderness in the pit of the stomach under the ensiform cartilage. Pain radiates upwards and to the left. Sternal anguish suggesting aneurysm or angina pectoris may be present. Pain is not relieved by pressure. Hyperchlorhydria is not a necessary concomitant of gastric ulcer as it may be absent. Gastritis is not always present except in the case of alcoholics. Haemorrhage is not such an alarming manifestation except as a complication. Vomiting depends upon the food taken and may be sometimes absent. Two or three teaspoonfuls of salt dissolved in a tumblerful of water or dilute Hcl (4%) swallowed by the patient gives rise to pain especially on empty stomach.

Duodenal Ulcer lying in the upper part causes many and painful symptoms, while one lower down may lie latent. When near the bile popilla, it may cause obstruction and biliary symptoms. Hyperchlorhydria may be present but is not constant. Haematemesis is rare but occult blood may be present. Pain occurs between two to four hours after food and is relieved by eating. Looseness of bowels, an unusual feature in gastric ulcer, is common in duodenal ulcer. Vomiting is rare. Variation of pain according to seasons and place is a common feature of duodenal ulcer.

Differential Diagnosis.

Gastralgia. When associated with hyperchlorhydria it is difficult to diagnose. It may be due to syphilis, if it recurs at intervals and is of long duration. But usually in syphilitic stomach there is achlorhydria.

Chronic Cholecystitis and Cholelithiasis. These through reflex irritation may cause symptoms of gastric ulcer like localized pain relieved by vomiting, hyperchlorhydria and occult blood. But there is a tongue-like downward projection of the right lobe of the liver. Tenderness is below the ribs also about 1″ from the vertebrae, between the 10th and 12th intercostal spaces on the right side. Occasionally there is slight elevation of temperature, loss of appetite and coated tongue. Urobilin is found in urine and sympathetic hepatic disturbance may be found sometimes with slight icteric tinge of the skin.

Chronic Appendicitis. The pain of gastric and duodenal ulcer radiates towards the back and upward and never downwards as in appendicitis except when complications are present. In appendicitis and cholecystitis there are symp-

toms of intestinal irritation although sometimes duodenal ulcer may cause diarrhoea.

HYPER-ACIDITY. In this condition pain excited by ingestion of food develop one or two hours after the meal. The intensity extends over the whole of the abdomen and chest. Regurgitation of acid fluid might occur. These attacks are temporarily relieved by draughts of warm water or milk or bicarbonate of soda. But vomiting is rare, haematemesis never occurs and localized pain of ulcer is absent.

ABDOMINAL CRISIS OF TABES. This occurs when stomach is empty and at irregular intervals. Knee jerks etc. are absent.

CANCER OF THE STOMACH. In the majority of cases debility, loss of flesh etc precede the local phenomena. The epigastric pain is lancinating in character and constant and less dependent upon the nature of food. Nausea is most frequent in cancer and vomiting increases the pain. Profuse haematemesis is rare, but small quantity of black blood mixed with mucus is frequently observed. Anorexia is an early symptom. Tumour in epigastrium is more frequently felt. Free Hcl. is rarely observed in stomach contents. Leucocytosis is usually absent in cancer while it is present in ulcer. Milk diet increases the pain in cancer.

REICHMANN'S DISEASE (GASTRO-SUCCORRHOEA). In this condition there is an excessive secretion of acid gastric juice at a time when the stomach should be empty. The four characteristics are (*i*) occurrence of pain four or five hours after a meal (*ii*) Presence of gastric juice in stomach even while fasting in the morning (*iii*) Hyperchlorhydria (*iv*) Rapid digestion of albuminoids. This condition is usually secondary to local pyloric or duodenal inflammatory condition (duodenitis) or an ulcer.

PYLORIC STENOSIS. In this condition the preliminary symptoms are those of a duodenal ulcer. After stenosis occurs, the patient complains of more or less constant pain worse after food. There is distension of the stomach after food and vomiting is more frequent and gives relief to the patient.

SYPHILIS OF STOMACH. The lesion may occur as definite gummatous ulcer or widespread gummatous infiltration. The symptoms closely resemble those of carcinoma. The general health is affected more than in ulcer. Pain is more or less constant as in carcinoma. Haemorrhage might occur. X rays show marked gastric deformity usually showing a long irregular narrowing of the pyloric canal or body of the stomach. Wassermann Reaction is strongly positive. In many cases there is hypochlorhydria.

CARCINOMA OF STOMACH. When it occurs at the lesser curvature on the anterior or posterior wall, symptoms may be absent till definite induration takes place. The chief symptoms are first of all those of local irritation. Sudden loss of appetite in an otherwise healthy person is important. There is significant decline in gastric secretion, localized distress after eating, eructation of gas and regurgitation. Nausea and incessant vomiting may occur early. When the growth projects internally, soreness, distress and pain might occur. Haematemesis is common.

Cancer in the pyloric region is attended with early symptoms as in the cardiac region. The symptoms are of pyloric irritation with spasm. There is motor insufficiency with eructations, nausea and vomiting with relief. Pain becomes constant. These are followed by cachexia, falling off in number of red blood corpuscles and amount of Hcl.

LEATHER BOTTLE STOMACH. In this condition there is diffuse formation of new fibrous tissue in the submucous coat of the stomach. The whole stomach is involved, the viscus is smaller, firmer and heavier. By some it is supposed to be a diffuse carcinomatosis. The symptoms are more or less of a chronic ulcer. X ray picture helps the diagnosis. The stomach is found to have no peristalsis and the meal passes rapidly as if through a patent tough tube.

TABULATION.

In the list given below are mentioned only those cases which have been operated on by me. The total number of cases undergoing operation is 53. Out of these, only one

was a case of gastric ulcer. Two were Carcinoma of stomach, one was syphilis of stomach and one was a doubtful case of syphilis or diffuse carcinomatosis and the rest were duodenal or pyloric ulcers.

GASTRIC ULCER. The patient S. E. a Beni Israel was suffering from abdominal pain for a long time for which appendicectomy was done. This gave him relief for about one year. Then the pain started again in the epigastrium worse after food with vomiting. Xrays showed an ulcer on the lesser curvature of the stomach. On opening the abdomen a hard fibrosed ulcer was found extending over three inches on all the sides more towards the Cardiac end. The whole appearance was more like carcinoma. As gastrectomy was deemed dangerous on account of the condition of the patient, gastro-jejunostomy was done. The patient was discharged free from pain and other symptoms. He was seen about three months after the operation and was free from symptoms. After that the case was not followed. Although gastro-jejunostomy is not the ideal operation for gastric ulcer, in this case benefit was found .

The two cases of CARCINOMA OF STOMACH were both advanced ones. In one the pylorus was involved forming adhesions with the pancreas. Partial gastrectomy was done but the patient died after 72 hours. In the second case the Carcinoma had involved the main body of the stomach. The stomach was immobile on account of adhesions ; gastro-enterostomy was done. but the patient died after two days.

DUODENAL ULCER INCLUDING PYLORIC ULCER. About fifty cases were treated by operation which can be classified under duodenal ulcer, post pyloric ulcer and pyloric stenosis. Out of this total number only four were females. The ages varied from 20 to 56 years. The duration of the disease was from three years to twenty years. In the majority of cases the symptoms were typical of duodenal ulcer like hunger pain etc. In every chronic case with adhesion, the pain was more or less constant. In the case of pyloric stenosis pain was more persistent and vomiting was a marked symptom. In some of these cases marked peristalsis was visible in the epigastric region. Emaciation was only noticed in very chronic duodenal ulcer cases and those with pyloric obstruction.

In nearly all cases, tenderness was most noticeable about an inch above the umbilicus a little to the right side, very rarely it was present a little to the left of this spot. In the majority of the cases the MACBURNEY'S point was also a little tender. In one case, the most tender spot was the gall-bladder region and the other symptoms also were more or less of cholecystitis ; but on opening the abdomen a thick pyloric ulcer was found.

In all these cases the operation done was posterior gastro-jejunostomy. In about the first twenty cases the abdomen was opened through the fibres of the right rectus and I had two cases of ventral hernia. Afterwards the abdomen was entered through the linea alba and the scar seemed to be much stronger and there were no more cases of hernia. The majority of the cases were operated under local anaesthesia 1% Novocain with adrenaline, and it was found that the shock was decidedly less than when general anaesthesia was used. Morphine atropine was always given half an hour before the operation.

The main criteria for doing gartro-jejunostomy were clinical symptoms and X-rays findings. Hyper-peristalsis of the stomach or soup-plate stomach, persistently deformed and worm eaten duodenal cap were the chief findings in duodenal ulcer, and dilatation of the stomach with obstruction at the pylorus in pyloric stenosis. In the majority of cases thickening was found at the pylorus especially when symptoms of pyloric lesion were present. Only a few cases showed the puckering and glistening appearance on the serous surface typical of an ulcer. No attempt was made to explore an ulcer on the posterior wall of the duodenum by opening up the lumen of the duodenum. Some of these cases had all the symptoms of duodenal ulcer ; Xrays confirmed the diagnosis and after operation of gastro-jejunostomy the patient did find relief.

For intestinal sutures, O catgut was used in all operations. The jejunum was anastomosed with the stomach at about four to five inches from the duodeno-jejunal flexure thus leaving a small loop. But no untoward symptoms were found except in one or two cases which were temporary. No attempt was made to deal with any ulcer individually by opening the lumen of the duodenum or try to bury it in the wall of the Gut. Gastro-enterostomy clamps were used in all operations.

Nearly all the cases operated, felt freedom from pain soon after the operation. Out of the total number operated only about twentyfive could be traced for some appreciable period after operation. Every body was advised to omit animal food, hot spicy and sweet things from the dietary and stick to bland diet only, with milk as the chief ingredient. For the first six months to one year, slight indiscretion in the diet gave rise to distress and sometimes pain in the stomach which stopped after errors were put right. Only one patient who came about three years after the operation said that he was getting the pain although a little less than before. Another patient operated in November 1928 has been getting severe colicky pains at intervals. She had been operated on, once before, for suppurating appendicitis. Now these attacks are intermittent and have been diagnosed as attacks of biliary colic by doctors whom she had consulted.

ACCORDING TO RELIGION :—37 were Hindus, 5 were Mahomedans, 6 were Christians, 1 was a Jew and 1 was a Parsi.

ACCORDING TO PROVINCE. :—34 were from the Deccan, 9 were from Gujerat and 7 were from Madras.

Meat eating was not found to be the chief cause of ulcer as good many of these cases were pure vegetarians. Use of large amount of chillies with food, irregularity as regards meals and too much of tea drinking were the histories given by the majority of cases. The largest number of cases came from the working classes, although cases were found among higher classes, merchants, priests, school teachers.

DEATHS—Altogether four deaths could be put as directly due to operation. One case, a weak emaciated man (aged 50) died on the 9th day after operation of gradual asthenia and weak heart. No special cause could be assigned except post-operative shock.

The second case that died had duodenal ulcer symptoms for over 7 years. He had attacks of Haemorrhage about six times, every attack occurring at an interval of six months. Out of these, three attacks of haemorrhage were extremely severe. The last attack was in November 1929 and the operation was done in May 1930 about six months after an attack of haemorrhage, when there was likelihood of another haemorrhage. The patient seemed doing very well till the 8th day when he got severe bleeding and expired within 18 hours. He was already very anaemic as a result of the previous haemorrhages and no attempt was made to deal with the ulcer locally.

The third case was a young man aged 23, very healthy otherwise, operated on 22-5-30. X-rays showed duodenal ulcer. The patient got severe bleeding and expired on the third day.

In the two latter cases it is significant to note the way in which the gastro-enterostomy clamps were used. In all the other cases they were used with the blades facing in the same direction, rubber tubes being used for the blades and the ends of the blades kept free. The clamps were used more for steadying the parts to be anastomosed than for compression. In these two cases, at the suggestion of an assistant the blades of the clamps were used facing in opposite directions so that the ends could be inserted and fixed in the rings fitted near the handles. Naturally the tubed blades compressed the guts more or less like artery forceps. I think the tight compression of the blood vessels of the gut walls caused the severe and fatal secondary haemorrhage. There is nothing else to account for these two most unfortunate mishaps especially the second case who was a healthy young man with no complications. Severe bleeding was never noticed before and after these two cases.

The fourth man died on the 7th day, an alcoholic with severe gastritis and adhesions. One more death was recorded in a patient, not directly as the result of the operation. The patient was relived of the pain of duodenal ulcer after the operation but got severe cough after some days and died of gangrene of the lung about three months after the operation. He was a strong well-built man with a long history of abdominal pain, a fireman by profession and slightly whimsical in behaviour.

Two cases got ventral hernia. In both of these cases, the abdomen had been opened through the fibres of the right rectus. No cases of hernia occurred though the incision through the Linea Alba was employed.

Below are given a few interesting cases :

Case 1—S. D. N.—A railway servant, age 33 suffering from abdominal pain for over five years. Diagnosis of duodenal ulcer confirmed by Xrays. Gastro-jejunostomy was done on 25-6-1929. Patient was free from pain after the operation. He was advised as usual to take bismuth mixture and abstain from all varieties of heavy food. He came to me complaining of abdominal pain in December 1929. After a good deal of cross-examination, he admitted having eaten all sorts of sweetmeats and fried things during the Dusserrah and Diwali holidays and in the intervals. He was warned not to repeat this indiscretion and asked to continue Bismuth mixture. The patient again came to me after a couple of months complaining of heaviness in the stomach and peculiar brown dermatitis on the hands and looking very anaemic. After some cross-examination, he admitted having again patronized halwa and fried gram and groundnut shops generously. He was sent to the Medical Ward of the King Edward Memorial Hospital where it was found that he was suffering from Addison's Anaemia. He was put on yeast treatment and improved immensely. He saw me again in 1930 November and was much better and had pain in the stomach and was following the directions about food etc.

Case 2—P. V. R.—admitted in the Nair Hospital for appendicitis. He had all the symptoms, local tenderness etc., of appendicitis. Appendix was removed in May 1928. It was found to contain threadworms and was slightly inflamed. The patient was completely free from pain for about three months. Then again he came with pain in the epigastric region appearing after food. X-rays revealed duodenal ulcer. Gastro-jejunostomy was done and pain completely disappeared.

Case 3—A Hindu beggar—admitted for pain in the epigastric region for the last nine years. Pain had some relation to food. Tender spot existed in the epigastric region and the patient was stout and well nourished. On taking a Skiagram he was found to have cholecystitis with gall stones. At the operation the gastro-duodenal area was found to be normal and the gall bladder which had good many adhesions was removed and was found to contain six small spiculed pigmented stones. The patient was discharged quite free from pain.

Case 4—B. A. Municipal Peon—Age over 50, a weak and very much emaciated. man. He had all the symptoms of chronic cholecystitis with local tenderness and pain in the gall bladder area but more or less constant pain in the epigastric region. Radiologist was suspicious of cholecystitis although he did not exclude post-pyloric ulcer. The abdomen was opened on 18-4-1928 more with the ideas of removing the gall bladder. On examination of the viscera, the gall bladder was found more or less normal. But the pylorus was found thickened indicating an old ulcer. Gastro-jejunostomy was done. The convalescence was stormy. The patient got persistent attacks of bilious vomiting which stopped only after gastric lavage. The patient was discharged much improved in health and free from pain. The patient was seen again about one year after the operation. Pain had not recurred and he looked improved in health.

Case 5—S. L. G.—Aged about 30. A typical neurasthenic. Had abdominal pain for many years. X-rays revealed duodenal ulcer. Gastro-jejunostomy was done, and the patient felt free from pain for a couple of months. He reported

twice during the course of one year after the operation. But he was saying that the pain had again recurred and was just like what it was before. Of course I was not sure if he followed the directions given for post-operative treatment, as he looked very weak-minded and neurasthenic.

There was only one case which was admitted for constant abdominal pain, epigastric tenderness, anorexia and all the symptoms of gastric carcinoma. The age was about sixty. The radiologist was suspicious of syphilis of stomach but could not completely exclude carcinoma. There was achlorhydria. On opening the abdomen the stomach was found to be completely free from any carcinomatous lesion. Blood examination showed strongly positive Wassermann reaction.*

* Paper read at the VII All-India Medical Conference held at Poona, April, 1931.

The Importance of the Training of Doctors in the Diagnosis, Treatment and Prevention of Leprosy

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Up to a few years ago leprosy was regarded by the medical profession as an incurable disease, and therefore outside the sphere of the doctor. The 1921 census showed some 100,000 lepers in India, but the census enumerators only took into consideration the more conspicuous cases, especially those with deformities of the hands, feet and face, and these form only a fraction of the total number.

Expert surveys carried out during recent years prove that there are from 5 to 10 times as many actual cases showing distinct signs, which can be diagnosed either clinically or by means of the microscope. Probably there are at least as many more who are infected, but never show any recognisable sign of the disease. In this respect, as in many others, leprosy resembles tuberculosis.

The diagnosis of leprosy is not difficult for anyone who has had a little training and experience, very simple when compared with tuberculosis. And yet in my experience only very few doctors have this knowledge. Many patients are sent to our clinic supposed to be suffering from leprosy who show no signs of this disease; and still more who are actually suffering from leprosy remain undiagnosed and are treated for other complaints.

Early diagnosis is all-important in leprosy as it is in tuberculosis, since early cases yield quickly to the remedies available; whereas, as the disease advances, treatment becomes increasingly more difficult. In the majority of cases of leprosy found in India a clear diagnosis can be made by testing the dermal sensibility, no apparatus of any sort, except a spill of paper, being neceesary. In a minority of cases a bacteriological examination is necessary to make a definite diagnosis. In many cases in which there is distinct leprosy, bacteriological examination is necessary to determine the type or the infectiousness of the case.

Some of the most dangerous cases, discharging large numbers of lepra bacilli from the nose and even along with the epithelial scales shed from the surface of the skin, would never be suspected of suffering from leprosy, even by the expert, without bacteriological examination. Such a highly infectious person may be employed even by a physician in any capacity, as a servant, compounder or clerk without his suspecting the presence of the disease. Self-protection is therefore a second inducement to the physician to familiarise himself with diagnostic methods.

When a patient has been diagnosed as suffering from leprosy, the next duty of the doctor is to find out *why* he is suffering from this disease. Of all those who are infected only a certain proportion ever develop leprosy; and those in whom the disease appears have lowered resistance

to Mycobacterium leprae. The reason for this lowered resistance is generally some other predisposing disease, some error of diet, some vicious habit or environment. Much skill is sometimes necessary in finding out the cause of lowered resistance; but once it is discovered and removed, the patient will often begin to improve even without any special treatment; whereas the best special treatment without the removal of such a cause will often prove useless.

The treatment of leprosy is therefore not a mere matter of giving a few courses of injections; the best skill of the physician has to be called into force. We have sometimes had to keep patients under careful general treatment for many months in the Gobra hospital before we ever ventured to begin hydnocarpus injections. During these months every system of the body was repeatedly tested and the general health of the patient gradually built up; only then, and at first in very small carefully regulated doses has the special treatment been possible. My third reason, then, for the need of careful training of the physician in antileprosy work is that, without such training and a thorough grasp of the principles mentioned briefly above, no doctor is qualified to treat leprosy, however eminent he may be in his profession or proficient in the treatment of other disease.

Doctors are often afraid to touch, and still more to treat a case of leprosy. If they suspect a leprous infection they will send the case away. This fear is bred of ignorance and superstition and is unworthy of our profession. The doctor who, through such unworthy fear, remains ignorant of the accurate diagnosis of the disease, the way in which infection is spread and the simple procedures of prevention, is much more likely to contract leprosy than one who studies it carefully and, taking due precautions faithfully attends to the patients who come to him for treatment.

There is reason to believe that leprosy is spreading in many parts of the country. In certain industrial concerns, where labour is recruited from highly endemic areas, an incidence of one per cent or even more is often found. Increased facilities for travel by rail and bus are spreading the disease from formerly isolated foci. Leprosy can no longer be ignored. It is essential for the public to know what means they should take to avoid it; and the medical profession has a duty to the public to see that they have this knowledge. It is true that tuberculosis is a more widespread and fatal disease, but the sanitary laws which apply to tuberculosis are those which are best calculated to prevent leprosy; and the dread which the public hold for the latter disease may be used as a lever in inducing them to adopt hygienic laws which will prevent the spread of both diseases.

The Indian Council of the British Empire Leprosy Relief Association has active branches in most of the provinces and states of India. Due to the efforts of the Bengal Branch and the co-operation of various local bodies, there are now over 60 special leprosy clinics in Bengal alone, and their number is increasing every year. Also many general dispensaries are treating leprosy, their medical officers having been given special training. But it is upon that general practitioner that the chief weight of responsibility falls. Arrangements have been made for special leprosy training of senior students in most of the colleges and schools of India, but there are a few medical institutions which still show indifference. Many hundreds of doctors have attended special courses in Calcutta and elsewhere and the provincial experts have given courses of training to others at district and municipal head-quarters; but still only a small proportion of the doctors of India have studied the disease.

Leprosy with its protean forms is one of the most interesting diseases that the doctor is called upon to treat; and there are few who have taken up its study thoroughly who have not been fascinated by the varying appearances and problems which it presents. While there is yet no form of treatment which can be called specific, yet research is year by year rendering it more and more amenable to treatment.

The object of this paper is not to deal with special methods of treatment, but to show the importance of the leprosy problem and to persuade those who are interested in their professional work that the study of this disease will thoroughly repay whatever time and trouble they may spend upon it.

Progress of Syphilology During the Last one Hundred Years

(Alfred Fournier Centenary Commemoration Lecture)

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ALFRED FOURNIER, the Father of Modern Syphilology, was born on 12th May, 1832. National Societies and International Organisations are celebrating the centenary in a manner befitting the magnitude of his services to humanity. Great writers, scientists, and ministers of healing, though born in particular country, soon cease to be bound by limitations of colour, creed or nationality and become eternal inspiration and subjects of worship to the entire human race. This year has already witnessed two world-festivals, in commemoration of the brilliant Goethe "the greatest German" and the lovable Scott. The best manner of celebrating an anniversary like the present one is a matter on which great divergence of opinion is possible and also quite natural. Few things, however, seem to be more fitting to the occasion than a bird's eye view of Modern Syphilology. It will not be denied that a review of the great advances serve best as guides to the present and future lines of clinical and laboratory investigations and it is in this sprit of enquiry and search after truth that the present survey is attempted.

SYPHILOLOGY BEFORE 1832.

Before one actually passes in review these one hundred years of honest endeavour and remarkable achievements, it is highly desirable that one should start with a glance at the state of Syphilology during the period immediately preceding the birth of Fournier.

It is perhaps neither profitable nor necessary in this article to discuss the interesting but controversial question of the Antiquity of Syphilis or the Columbian Origin. About a hundred years ago, the aetiology of Syphilis was still obscure, though the fantastic and ridiculous ideas of the previous centuries were gradually disappearing. Soon after its appearance, Syphilis was attributed to various causes, i. e., divine wrath, astrological influences, rains and inundations, intercourse of a leper with a prostitute, poisoning of wells etc. After Syphilis became endemic, its sexual origin was recognised. Bethencourt (1527) regarded it as a contagious disease, beginning as a small ulcer, soon followed by changes affecting the mouth, pharynx etc. Fracastorious did recognise the venereal cause. Fernel (1554) discussed the various modes of contagion (contact transmission) but thought that infection occurs only if continuity of skin is broken. Sydenham thought that Syphilis was only modified yaws. John Hunter, the great Surgeon, accidentally inoculated himself with Syphilis and delayed treatment. He gave support to the views, current in the 16th and 17th centuries, that Gonorrhoea was a symptom of Syphilis. That a clinician of the eminence of Hunter, who differentiated between soft sore and hard sore, now known as Hunterian Chancre, should have added to the existing confusion, by his authority, may be remembered by all the medical profession with humility and advantage. There was also some confusion and controversy regarding mixed types of chancres. In short, medical men were tossed between the 'Unicist' and 'Dualist' doctrines.

The most prominent of the clinical symptoms seems to have been the eruption. Durer's allegorical pictures represented Syphilis as a body spotted with rash. Joint lesions were known. Syphilitic spondylitis was described by Portal in 1797, under the name of Syphilitic Pott's disease. Aneurysm was described by Fernel, and later by Ambrose Pare, the great Army Surgeon, and Morgagni, the pathologist, but was not fully understood by the medical world. Syphilis of the nervous system was first mentioned by Morgagni, and later by Van Sweiten (1772). Syhilitic hemiplegia was known. Haslam described in 1798 the first case, which

though not so named, was one of G. P. I. The recognition of G. P. I. as a nosological entity is ascribed to Bayle (1822—Thesis). Hereditary transmission had been recognised long ago by Paracelsus (1526) and later by Ambrose Pare (1633).

Fournier states that invocations to holy saints and pilgrimages, constituted the earliest treatment of Syphilis, on account of the then current aetiology. Soon after, analogy led to the trial of Mercury which was in common use for Dermatoses. Mercury was the sheet anchor, both as an internal medicine and as an external application. Vigo (1514) had recommended inunctions for Syphilis. Fracaster in his poem on Syphilis mentions inunctions. Besides inunctions, there were two other methods dependiug on cutaneous absorption, One was the famous "Emplastrum de Vigo" which besides Mercury contained no less than 23 drugs (Frogs, Earthworms, Viper's fat etc) supposed to be endowed with marvellous virtues. Later still, mercury was used in the form of fumigations. Red precipitate was used as a pill by some. The pills of Barberouse, known in history and the Keiser's sugarplums familiar to students of French literature are two well known instances, Van Sweiten's Liquor containing sublimate was another popular remedy. But mercury was not the only drug that was used. Even as early as 1500 A.D., there were doubts as to the efficacy of the drug. Later, the great suffering caused by excessive mercurial poisoning and frequent deaths due to fumigations, induced Urlich Van Hutten, to write a book (1519) recommending the employment of Guiac in the treatment of Syphilis. "He had been cured himself" Bevenuto Cellini, thought that he had cured himself with the same remedy. Opium was used for a while. Decoctions of various woods from the Orient, Sarasaparilla, oranges, etc were in use at some time or other under various names (Feltz's decoction, Zittmann's decoction, Polloni decoction etc.). Sulphur was recommended as long ago as 1535 by no less an authority than Fracastorius. Natural springs of Sulphur waters began to attract attention. Arsenic was recommended for Syphilis by Paracelsus in 1529 and later by Astruc, Van Sweiten, and Hunter. Fowler's solution was introduced in 1756 and Donovan's solution in 1748. Sooner or later, however, the oldtime Syphilographers turned back to Mercury and Mercury retained this honoured position a hundred years ago. To Boerhaave and Van Sweiten was due the high favour which the sublimate attained. Fallopius in his book Marbo Gallici (1564) advised as prophylaxis, washing the parts immediately after coitus and placing over glans penis a cloth impregnated with gentian, santal, aloes etc. Agato had recommended mercury fumigations. Desault (1773) advocated mercury ointment. But these methods subsequently failed to command any attention till very near the close of the 19th century. Abortive treatment was suggested by Jean de vigo (1514), by Corbis in the 18th century and by Hunter It was thought that by destroying the nodule immediately after its appearance, diffusion of the poison to all parts was effectively prevented.

This, in brief, was the unsatisfactory state of affairs in the first quarter of last century.

Now, this century of progress may be conveniently divided into a few epochs, though a certain amount of overlapping is inevitable. The first period, 1832 to 1860 may best be described as the Ricord epoch, after the great French authority. The second period 1860 to 1900 may be rightly named as Fournier Epoch, a period of acute clinical observation and the inauguration of the transition to modern conceptions. The twentieth century began with great promises. The three decades of the present century form three distinct epochs by themselves, short but crowded with brilliant results.

The Ricord Epoch. (1832-1860).

Ricord (1799-1899) the brilliant and witty Frenchman, is usually regarded as the greatest authority on Syphilology after John Hunter. The credit of establishing the autonomy of Syphilis and Gonorrhoea by patient work between 1832 and 1837 goes to Ricord. His treatise published in 1838 has become a land

mark in the history of medicine, for demolishing the erroneous ideas of HUNTER as to the identity of the two diseases. Here, again, it may be recalled, as a proof of human limitations, that Ricord regarded Gonorrhoea, not as a specific disease but a simple catarrh, produced by various irritants. He also maintained that Syphilis was not inoculable. He said "Destroy chancre in the course of induration; you destroy the constitutional infection" But his services to Syphilology were not inconsiderable. He divided Lues into primary, secondary, and tertiary stages, a classification, "useful for clinical and chronological purposes but is quite inadequate from the point of view of pathology." Ricord also describes the vaginal, urethral, and uterine chancres. He contended that Syphilis affects both testicles. He was the first to publish a case of nodule of Syphilis in the heart. He also noted the rarity of reinfection. It was Ricord who popularised the treatment by potassium iodide, which had been introduced in 1831 by Biett. Later on, he used Liq. Sodii Arsenicalis in conjunction with iodide. Professor Cole remarks "It remained for the great Syphilographer Ricord to put the treatment of Syphilis on a rational basis. He advised mercurous iodide pills (Ricord Pills) by mouth, using smaller doses and endeavoured to discourage severe therapy. Treatment was continued for 6 months and then followed by potassium iodide administration."

There were a number of patient observers, who contributed, by their patient labours, to the advancement of knowledge, by putting forward provisional hypotheses to explain certain features of the disease and stimulating others to confirm or controvert their statements.

Of these, Abraham Colles of Dublin (1773-1843) was one of the foremost. He wrote his practical observations on venereal diseases in a book (1837) and enunciated the Law of Immunity (Colles's Law.) The mother was supposed to be rendered immune in bearing a child by the passage of some sort of protective substances from the foetus. It may be pointed out that after the perfection of the Wassermann Reaction, investigations established that 90% of the mothers of syphilitic children gave a positive W. R., whether the mothers had clinical symptoms or not. They were all infected though the disease was in a latent form.

Profaeta stated that the apparently healthy child of a syphilitic mother likewise acquired an immunity and that there was little chance of the child contracting syphilis from the mother. At the present day, it is known that the child is infected in extreme degrees of latency, the only sign of infection being a positive W. R.

Wallace of Dublin pointed out (1835) the contagiousness of the secondary lesions.

Another great step forward was taken when the agelong confusion between the soft sore and the syphilitic sore was cleared once for all. Chancroid was separated from the specific sore by Bassereau in 1852. The controversy regarding the doubtful forms was put to an end by J. Rollet (1858) who explained them as mixed or superimposed conditions.

The experimental inoculability of syphilis was, contrary to the views of Ricord, demonstrated by Julius Bettinger in an anonymous protocol in 1858. Contagiousness of blood was described by Waller and Pellizani in 1860.

Diday stated the Law of Decrease (Diday's Law), which does not always hold good. There is an "irregularity in sequence" alternating transmission. Diday taught that parental syphilis might be transmitted by mother alone or by father alone or by both. The possible modes of congenital infection, the relative ferquency and the controversies that raged round the hypothesis are too numerous to be referred to here. The interesting records of cases cited by Pinard, Neisser, and Jeseinek later on, contributed to clarify the issues to some extent but the whole subject teems with thorny problems.

Syphilitic affections of the nervous system were noted but these observations seem to have been either neglected or quickly forgotten. According to Monrad-Krohn of Oslo, some pioneer work in this branch was done by his countrymen. Dr. Gjor pointed out in 1857 the

early occurrence of nerve complications in syphilis. Stenberg of Copenhagen also emphasised the early involvement of the nervous system (1860). To the French is assigned the honour of the discovery of the relationship between G. P. I. and Syphilis. This was a subject for recrimination and polemics for many years. In 1857 Esmarch and Jessen expressed the opinion that syphilis is always the cause of G. P. I. This view was based at first mainly on statistical evidence. Duchenne (1806-1875), the founder of French Neurology, introduced the term "Locomotor Ataxy" for a group of symptoms. Jean Charcot (1825-1893), the Chief of the Salpetriere Hospital, the most renowned neurological clinic of Europe, first described the joint lesions, now familiar to all as Charcot's Arthropathies.

Intramuscular and subcutaneous injections of Mercury were introduced by Scarenzio in 1864 but the method did not enter into practice till after the publication of the results by Lewin (1867). There were many workers, who enlarged our field of vision but limitations of space forbid any attempt to mention them all among whom we are already familiar with Sir James Paget, the surgeon, and Sir W. Lawrence, the ophthalmologist, the two eminent teachers of Jonathan Huchinson. By 1866 was brought into existence the first journal exclusively devoted to this speciality "Giornale Italiano di Dermatologia Sifilologia."

The Fournier Epoch (1862-1900).

Alfred Fournier, the father of modern syphilology, transformed the whole subject as much by his wide experience, careful collection of data, great powers of observation and teaching as by the stimulus he gave to the band of noble workers all over the world, to tackle the disease from new approaches. He was one of the rare phenomena, being both a professor and a prophet.

His observations on the primary sore led him to teach that individuals developing large chancres followed by florid secondary rashes, are less likely to develop infection of the nervous system and other internal organs and are more rapidly cured than subjects developing small chancres and mild secondary eruptions. Experimental work now supports this view, that when the host is liable to produce a large local reaction about invading spirochaetes, something is produced, which tends to check the virulence and the distribution of spirochaetes.

Fournier was the first to describe syphilitic fever in great detail. He discussed the aetiological factor of syphilis in arteriosclerosis, aneurysm and the predisposition of syphilitics to tuberculos is. Osteitis Deformans and Gastric syphilis came into his purview. He maintained that congenital syphilis was transmitted by either the mother or father or both and drew pointed attention to paternal transmission. He collected a mass of evidence of recent infections of wet nurses by syphilitic sucklings. He reported cases of Little's palsy due to syphilis. He first pointed out to the medical and the lay public the far-reaching and diverse consequences of congenital syphilis, including some forms of epilepsy, muscular atrophy, arrested development, malformations, etc.

He advanced syphilology a step further by the introduction of his conception of Parasyphilis or Quarternary Syphilis, a term (now deservedly obsolete) by which he designated "a series of morbid manifestations which although they have nothing syphilitic in nature, are none the less syphilitic in origin in that they are born of syphilis and produced by its existence and in all probability would not have been produced without it". He includes Tabes Dorsalis, G. P. I., Epilepsy, muscular atrophy etc. under parasyphilitic syndromes. As Hutchinson, his great contemporary, remarked "Fournier has taught us that syphilis gives rise to numerous nervous manifestations and myelitis." Mental symptoms and syndromes, due to syphilis were grouped and described by him. He recorded cases of labyrinthine deafness and of deaf-mutism due to syphilis. Mott observed that Fournier should be given the credit for being the first to consider syphilis as *the cause* of G. P. I., instead of believing it merely as an accessory cause. According to Fournier, the subjects of neurotic temperament

and those who lead a life of excitement or of constant vicissitudes, are candidates for G. P. I. It is also well known that it was Fournier who first pointed out Tabes as a disease due to Syphilis (1875), He was later supported in this view by Gowers. Fournier found 90% of his 750 cases of Tabes to be Syphilitics. Erb later established evidence of syphilis in 90% of 1100 cases. Fournier also drew attention to Juvenile Tabes in 1886.

He improved the treatment of syphilis. Fournier, along with Hutchinson, shares the credit of popularising the "pill" treatment of Syphilis. He favoured the protoiodide and sublimate as the pillars of mercurial medication by mouth. He had also confidence in inunction well performed and considered it specially indicated in congenital and visceral syphilis. His famous chronic intermittent treatment covering a period of 6 years, is an indication of his thorough methods. Apart from the drug treatment, he was a warm advocate of hydrotherapy, now becoming fashionable in the treatment of Neurosyphilis. He regarded the preventive action of hydrotherapy as equal to its curative effect and prescribed it in all cases in which he suspected hereditary or personal predisposition to Neurosyphilis. He anticipated modern neurologists in his statement that alcohol was the born enemy of the syphilitic. Prophylaxis of syphilis also focussed his attention and he discussed the social and moral aspects of this question. One passage may be quoted to show how amazingly modern and comprehensive was his conception of the treatment. "To treat syphilitic lesion, it is sufficient to make the diagnosis and apply the remedy which experience has shown to be the best under the circumstances ; while the treatment of syphilis, looked upon, not as lesion, but as a disease is much more cemplex and comprehensive. The latter includes a number of most different questions all difficult, controvertible, and controverted.....To treat syphilis is not only to attack and cure the manifestations of a day or even of a period ; it is also and especially to treat the disease as a whole, to attack it when patent and latent ; to lay hold of its primary cause, the origin of its actual and future determinations. It is to institute a treatment of long duration—which alone is sufficient to realise preventive effects—to protect the patient against the future and to safegaurd not only himself but his posterity." Wise words, whose truth is confirmed by the epoch-making discoveries of successive generations and whose significance the medical profession in India has not yet understood, even remotely.

JONATHAN HUTCHINSON, (1829—1913).

JONATHAN HUTCHINSON not inaptly described as the greatest general practitioner of his day, is the *doyen* of the British Syphilographers. In 1876, before the London Pathological Society, he held that Syphilis was due to a specific and living microbe, contagious and transmissible as long as the microorganism retained its vitality. His genius in diagnosis and his philosophy were remarkably combined in all he wrote on syphilis. He described the peculiar physiognomy of Tabes. From 1858, onwards, a series of articles were contributed by him under the title "On the different forms of inflammation of the eye consequent on congenital Syphilis." By careful collection and collation, he was able to establish the connection between the eye and Syphilis. He overthrew the old name of "Scrofulous Corneitis" and first gave the name of Chronic Interstitial Keratitis. About the same time, he reported on the effect of infantile syphilis in marring the development of teeth. Later, in 1861, HUTCHINSON and HUGHLINGS JACKSON, published cases of deafness associated with syphilis. These three characteristic symptoms are now collectively designated Hutchinson's Triad. Perhaps, there is a great deal of truth, in the remark that hardly anything new has been added to the knowledge of this sublject since Hutchinson published his numerous clinical observations.

The methods of treatment and formulae advocated by him were also marked advances on the prevailing fashions. He recmmended prolonged treatment with mercury. Every medical student knows the Hutchinson's pill.

It is interesting to note that Hutchinson

regarded yaws as a variant of Syphilis. Even to men of vast clinical experience, accurate diagnosis of early lesions of syphilis was not always as easy as it is said to be at the present day, with the dark ground illumination to spot the Spirochaeta Pallida, in the serous exudate. Hutchinson made a diagnosis of syphilis in a case but was disappointed when it developed into small-pox two days later.

His introduction to "The System of Syphilis" by D' Arcy Power and Murphy (1906) is classic. Hutchinson's article on syphilis in the first edition of Allbutt's system of Medicine (1897) was put in the list of "Infectious Diseases of Unknown Bacteriology." He was fortunate to live long enough to see the article transferred to its right place in the group of "Systemic Infections of Established Bacteriology" in the second edition of the great work (1912). He was, as he described himself, "A man of hope and forward looking mind." As early as 1876, he remarked "Some one will see it (the microorganism) one day, for it is beyond doubt that it must be there." He lived to hear the fulfilment of his prophecy in 1905.

A brief reference must now be made to other workers and other advances, of the later half of the 19th century. Pathological studies in syphilis were attempted. Samuel Wilkes had already made observations on Visceral syphilis and became F. R. S. for this work. Welch published (1875) the results of his examination of soldiers affected with Aneurysm wherein he found obvious evidence of syphilis in 50% of cases. In 1868, Allbutt first gave description of the histological changes in syphilitic disease of cerebral arteries, on which subject Heubner also wrote in 1874. Allbutt described the Ophthalmoscopic appearances in Tabes (1867-1874) and the obscure neurosis of Syphilis (1874). Erb had described Syphilitic Spastic Paraplegia. Pseudo-tabes was known. Juvenile G. P. I. was noticed by Clouston in 1877. Broadbent, Gowers, Jackson, Buzzard, had contributed to the knowledge of Neurosyphilis. Mott was describing spinal syphilis and Brown-Sequard Syndrome due to Syphilis. Intravenous injection was inaugurated by Bacelli in 1893 and was immediately popular with some medical men, sublimate, cyanide and benzoate of mercury being the drugs used. But Fournier gathered from his colleagues and from his own personal experience that this method, while less efficacious, had more risks for the patient and for the physician. Calomel and greyoil were also popular as intramuscular injections. Injection of Serum was reported on favourably in some quarters. "Syphilis d'emble" had attracted attention. Diagnosis depended only on the Xanthem and the Gumma. Gull's remark "Well, I think syphilis is a flesh and blood disease" shows that the aetiology and pathology were still obscure, at least, to some. At the sametime, syphilology had become an extensive speciality requiring a universal effort. The International Conference on Dermatology and Syphilology in 1889 had brought together all the enthusiastic workers in the field to enlighten each other and to formulate schemes of cooperative effort. Fournier was still the greatest living authority and was completing the transition from dogma to rationalism in Syphilology. A new century, and a new world of Knowledge was being born.

THE TWENTIETH CENTURY.

The First Decade

At the beginning of the twentieth century, the new Science of Bacteriology, which received great stimulus and inspiration from the brilliant researches of Pasteur and Koch, focussed the attention of the advance guard of research workers on medical and natural sciences.

Metchnikoff and Roux demonstrated that higher apes could be inoculated with human Syphilis, (1903-1904). Neisser injected tissue extracts of such apes and found them infectious before the sore develops. So, the truth began to be understood that sore is not the earliest effect of generalised Syphilis. Metchnikoff also experimented on the chemical prophylaxis of Syphilis. It may be recalled that the end of the nineteenth century saw a reawakening of interest in prophylaxis of Syphilis. Berhmann, Cohn, Ritcher and Loeb advocated mercury ointment immediately after coitus. Numerous

experimental observations, particularly one on a medical student volunteer, led Metchnikoff to conclude that "shortly after the inoculation with Sp. Pallida, if the seat of entry be well rubbed with 40% calomel ointment, no further symptoms will appear." In addition to these ordinary lines and normal pace of progress, unexpected and farreaching advances were made in three fields, in the short space of five years, forming the latter half of the first decade.

THE DISCOVERY OF THE SPIROCHAETA PALLIDA.

The first in chronological order was the discovery of the specific micro-organism of Syphilis by Schaudinn and Hoffmann in 1905. Of considerable interest in this connection was, however, the possibility of the Spirochaeta of Syphilis having been first seen and briefly described by by Donne (1837) in the study of chemistry and the cells of vaginal secretion. He appeared to have seen spiral shaped organisms in secretions of syphilitic ulcerations of female genitalia and he called the organism "animalcule." Kolmer concludes that the "animalcule" of Donne is Sp. Pallida and not any one of the saprophytic Spirochaeta. According to Rill also this micro-organism was seen before but its significance was not appreciated. That the the pathogenic microorganism might be a protozoa was first suggested by Klebs (1879). Later on, this view was maintained by Doehle, who described flagellated bodies. Later still, Seigel described a protozoa. There were others like Lustgarten, van Neisser, Jullien, and DeLisle, who claimed bacteria as the specific organism. Of some historical importance was the announcement by Lustgarten in 1884 of a discovery of a bacillus but this was later shown to be tubercular Bacilli and the one in genital chancres to be the "smegma bacillus." As Osler wisely remarked—"The story of the search for the cause of Syphilis is a tale to make the judicious grave" "One hundred and twenty five causes of Syphils" said Lassar in 1905, "have been established during the last twenty five years."

After preliminary experiments extending over many years, Fritz Schaudinn (1871-1906) and Eric Hoffmann succeeded in discovering the causal organism of Syphilis, which had eluded discovery so long. They had been engaged in proving the presence of roundish pearshaped microorganisms which had been claimed as the specific germs. After painstaking research the round bodies proved to be common to other lesions and not the causal organism of Syphilis. Therefore, when on 3rd May, 1905, they discovered in the tissues of a syphilitic ulcer, a spirillar threadlike organism, they were careful to submit it to exhaustive tests before announcing their discovery of the true microorganism. On May 17th, the authors, made a cautious communication to the Berlin Medical Society. A week later, during the discussion of the matter, a number of clinicians were able to confirm the presence of Spirocheta Pallida in syphilitic ulcers. The attitude of the medical world towards the new discovery was still one of intense suspicion. Bergmann, the president of the Society, concluded the discussions with a remark characteristic of this scepticism—"This closes the discussion till another syphilitic agent claims our attention." It is stated that he had, during a period of 30 years, to witness the discovery and subsequent withdrawal of the claim, of twenty five causal organisms. Fortunately for humanity, Bergmann's scepticism proved to be undeserved and no other agent has claimed the honour. Soon after the demonstration of the organism, the transference of disease to apes, rabbits etc. was so conclusive that the last remaining sceptic was obliged to keep silence or was converted into a believer.

It is a matter of great regret that Schaudinn died on 22-6-1906, before he attained the age of 37 years, bringing to an abrupt close the investigations which were carried out in cooperation with Hoffmann, who, however, has continued to add to human happiness not only by his medical studies but also by his beautiful poems. Hoffmann's researches made possible the transmission of Syphilis to animals and paved the way for chemotherapeutic research. Hoffmann was one of the first to try salvarsan and had a large share in carrying out experiments with salvarsan.

In rapid succession, the microorganism was found in every possible location of the primary sore and secondary rashes and even in Visceral affections. Contagiousness of saliva, milk, semen, urine etc. formerly recognized, now received bacteriological confirmation by the presence of Sp. Pallida.

The terminology, the microbiology, the life-history, possible variations of Sp. Pallida are very interesting though controversial but have to be regretfully left out in this historical survey.

The second of the triad of discoveries, was the evolution of the Wassermann Reaction and the recognition of its value in diagnosis. (1906). The history of this test is also very interesting, as seen from the following quotation from Kilduffe "In endeavouring to explain the cause of serious results consequent on transfusion of blood, the Belgian worker, Joules Bordet discovered (1898) the presence of serum hæmolysis. He explained this as due to combined action of complement and amboceptor. Bordet, in conjunction with one of his students, Octave Gengou, devised and published the fiirst complement fixation reaction in 1901. The first direct application of the test to the study of disease was made by Widal and Lesord, who applied it to the diagnosis of Typhoid. So far, the phenomena was explained on the basis of Ehrlich's sidechain theory of immunity. Later it became evident that if the antigen is known the antibody could be found or demonstrated. The next attempt was to apply the reaction to the diagnosis of Tuberculosis. Wassermann, a pupil of Ehrlich and Sacchs, attempted, using tubercular serum, to demonstrate antibody in the diseased organs, but without marked success. Then, in conjunction with Neisser, who was studying experimental syphilis in monkeys, Wassermann and Bruick, next applied this test to Syphilis in 1906. Their paper was followed in 14 days by a report from Detre, who was working independently all the while and arrived at the same conclusions, about the same time. Thus was born the Wassermann Reaction."

The explanation of the phenomenon, the theories regarding the nature of the reaction, the antigens used successively, the discrediting reports that appeared in connection with the occurrence of the positive reactions in other diseases, the numerous modifications of reagents, technique etc. are very intricate problems, the exclusion of which is almost imperative in this article. Sooner or later, the Reaction gained popularity and improved considerably with usage and experience. The relation between Syphilis and the so-called parasyphilitic lesions, G. P. I. and Tabes, formerly based on logical or statistical grounds, became established firmly when the C. S. fluid of these patients gave positive Wassermann Reactions.

Some serologists were not satisfied with the specificity or sensitivity. Michaelis (1907) made an effort to so alter the proportions of antigen and serum employed as to render visible to the naked eye these flocculent masses. This also aimed at simplicity in serological diagnosis. Later Sacchs and Georgi, Meinicke, Kahn, Muller, Dreyer, and Verne modified and perfected different techniques for performing the Precipitation Reactions.

The tripod on which modern syphilology stands was completed by Ehrlich in 1909 by the discovery of Salvarsan. On September 20th, 1910, Paul Ehrlich gave his memorable address on the preparation '606', later named Salvarsan, to the assembled company of the "Society of German Scientists and Doctors" at Koenigsberg, and handed over to the world the long sought remedy—not still perfect however, "the Therapia Sterilans Magna," the quest after which has all the grandeur of an epic story about it.

Only Mercury was considered worthy of being regarded as a specific for syphilis from 1500 onwards. Modern chemotherapy is based upon the work and discoveries of many individuals, "not only in the realm of synthetic chemistry but likewise in the fields of parasitology and immunology." Development of the organic preparations of arsenic originated from the discovery of 'atoxyl' in 1863, by the humble French Chemist Bechamp, who deserves to be remembered for this service to Medicine. The

credit of discovering the application of experimental trypanosomiasis for the conduct of Research belongs to Laveran and Mensil. This was followed by experimentally produced spirochaetal infections—spirillosis of Fowls, chicken, syphilis of rabbits,—all procedures which have proved to be of the utmost value, yielding results of paramount importance. But for the fortunate circumstance of the discovery of such means of producing infections on a large and cheap scale, research would have been crippled. The fact that many compounds were both trypanocidal and spirochaeticidal helped in testing curative activity of chemotherapeutic agents.

Ehrlich (1854-1915) as a medical student, seems to have been impressed by HAEBEL'S work on lead poisoning. This is said to have stimulated him to contemplate on the ways and means by which drugs are distributed over the body and guided into valuable series of studies upon the selective affinity of synthetic drugs for blood and other body cells. These investigations drew him into a consideration of the selective affinities of chemicals for parasites. He pronounced, as a basic principle, the doctrine that "parasites can only be destroyed by those materials for which they have a certain affinity and by which they are fixed or anchored" (Parasitotropy). In 1903, Ehrlich found that atoxyl had no effect on trypanosomiasis in Vitro.

In 1904, working with Shiga, Ehrlich published his first experiments, which culminated in the discovery of a trypanocidal dye, 'Trypan Red.' In 1905, THOMAS and BRIENL showed that atoxyl had a destructive effect on trypanosomiasis in animals by virtue of a derivative formed in the body. Ehrlich himself stated that he was led by the work of THOMAS to restudy the chemistry of atoxyl. He investigated the constitution and found that there were possibilities of the synthetic production of different combinations. When the specific microorganism of syphilis was discovered to be a protozoa, atoxyl was naturally tried in syphilis. It was, however, soon abandoned owing to the frequency of optic atrophy as a complication. Ehrlich then experimented with various derivatives of atoxyl to produce a compound with greater selective affinity for the parasite than for body cells of the host. He applied his sidechain theory to the action of drugs on spirochaetes and was so impressed with arsenic that he announced—"What iron does not cure, arsenic cures; what arsenic does not cure, fire cures." As a result of prolonged, laborious and systematised laboratory tests Ehrlich, Bertheim and Hata, were rewarded by the discovery of Salvarsan—the greatest triumph in the Science of chemotherapy. "606" had maximum parasitotropic and minimum organotropic effect. It was first tried in experimental syphilis of rabbits, made possible by the experiments of Bertarelli (1906), Parodi (1907), Hoffmann (1908), Levaditi and Yamonuchi (1908). Arlt first tried the drug in human syphilis, in G. P. I It was then tried by Schreiber in cases of early syphilis with good results. Weschelmann then used it extensively at Rudolf Virchow Hospital in Berlin and published the results of 1400 cases, comprising all stages and forms of syphilis. Soon testimonies poured in from all countries, "even from far Japan," and Salvarsan bacame the routine treatment of syphilis.

The Second Decade (1910-1920).

The second decade commenced in a mood of exhilaration on account of the great achievements of the preceding one. Great expectations were raised that the disease would soon be stamped out from the Earth. The new drugs were being extensively tested all over the world. Reports of complications of Salvarsan therapy were pouring in from all countries. Ehrlich himself was continuing his investigations. Finding that "606" was very toxic, he tried to improve on it and finally succeeded in producing "914." Ehrlich also anticipated modern advances in experimenting with the hope of increasing the potency of N. A. B. by combination with different molecular proportions of heavy metals, having parasiticidal power, and even prepared silver-salvarsan (1912) but died before the completion of his work, leaving it to Kolle, to test and place this combination in the hands of the

Syphilologists. Ehrlich also prepared Myosalvarsan (1912) but the drug was introduced to the profession much later by Lehnhoff—Wyld (1919), as sulpharsenol. Drug fastness was noticed by Ehrlich, who explained it as congenital absence of suitable receptors. About (1912), cases of precocious clinical neuro-syphilis after salvarsan were noticed. Though supposed to be due to neurotropism of Salvarsan, Ellis, who summarised the available data showed that these neuro-recurrences were due to Sp. Pallida. The value of Lumbar Puncture and examination of C. S. fluid came to be recognised. As an aid to diagnosis, Lange brought into practice, in 1912, the gold sol test, the theory of which is based on Zsigmondy's work on metallic colloidal solutions (1901). Other tests like those of Nonne Appelt, Ross-Jones, Noguchi came into use.

New drugs were synthesised. Danysz announced the discovery of compounds of arsenic with metallic compounds. Moneyrat introduced Galyl in 1913. Attempts were made to utilise new routes of administering the specific drugs, with the hope of securing the greatest therapeutic effect. Ravaut was the the first to introduce anti-syphilitic drugs directly into the theca. Byrens of Johns Hopkins used mercury serum intrathecally. Swift and Ellis of Rockfeller Institute elaborated the technique of injection of salvarsanised serum intrathecally (1914.) Intracisternal and other more complicated techniques had been advocated later but did not find general acceptance.

The relationship of Tabes and G. P. I. to syphilis was finally settled, by the conclusive evidence adduced by the discovery of Sp. Pallida in the brains of Paretics and the spinal cords of the Tabetics, by Noguchi and Moore in 1913. This was soon confirmed by Levaditi and also by Mott. McKintosh and Fildes furnished evidence that in G. P. I. and Tabes, there is an interstitial and perivascular reaction similar to that of secondary Syphilis. Numerous intricate classifications of Neurosyphilis appeared.

Noguchi (1876-1928) was started on his studies of the Spirochaetae by the discovery of Schaudinn and Hoffmann. In 1910, Noguchi reported that he had grown Sp. Pallida in cultures and produced by inoculation of this culture, syphilitic lesions in rabbits. His 'Luetin' test was a bye-product of his success in cultivating the organisms. Warthin (1866-1931) began his fruitful studies on syphilis from 1910 onwards, working primarily on the Pathology of syphilis, especially of the Cardiovascular System. Warthin demonstrated Sp. Pallida in Heart Muscle and established the necessity for microscopic diagnosis as against the crude macroscopic examination.

The existence of the provocative reaction was first pointed out by Gennerich in 1910, and was further studied by Stokes and O'Leary, who established its value in diagnosis, (1917). Mechanism of infection was further studied by Reasoner. by Brown and Pearce, and by others. Balzer and Berthalamy proved that Sp. Pallida could penetrate normal integument. Infectivity of semen was further demonstrated by Neisser and Hoffmann. Trauma in relation to Syphilis, the questions of local reactions, tissue injury etc were also attracting the attention of the investigators. Browning, Lane, Probey, Halberstadter, Voegtlin and other workers investigated drugfastness and pointed out the varieties in type under varying circumstances. Theoretical chemoreceptors, may not, in the presence of different protoplasmic constituents, have the property of union ; as shown by the work of Voegtlin in relation to SH compounds in body cells.

Mechanism of action of Arsenic was further interpreted. Ehrlich thought that pentavalent arsenic must be reduced to trivalent compound before it can act as a parasiticidal agent. Levaditi stated that the action of the organic arsenicals in vivo is not a direct simple reaction upon the parasite but that a change occurs in blood and other tissues, resulting in the formation of a new compound with protein "Trypanotoxyl". Voegtlin and Smith explained the action as a simple change of oxidation and reduction, without the formation of new protein-compound. The view of Uhlenhuth and Woith—that the action was due to formation of antibodies—does not seem to get any support.

The first harvest of experiences with new drugs was hardly begun when the great World War broke out. Those five years of anxiety, with the most deplorable consequences to the very foundations of human society, afforded, on a gigantic scale, an extensive clinical and laboratory experiment, with unparalleled opportunities to observe syphilis in all its aspects, and to learn about the indications, complications and efficacy of different treatments. While one nation was fighting another, syphilologists of all nations, in all fronts, were engaged in a fight against the unseen foe. Prophylaxis of Syphilis, under different conditions and using various chemicals was practised during the war, and many valuable observations have been added. Abortive treatment also has been successfully attempted at the front and the possibility of developing the method in civilian practice remains still the subject of some investigation and considerable controversy.

The Third Decade (1920-1930)

The calm that followed the storm was utilised to collect, shift, and consolidate the knowledge gained in the great war. The medical forces of the whole world were now concentrated on research in the light of previous experiences. Brown and Pearce brought animal infections as near to the human infections as possible (1920).

The painful and uncertain effects of Mercury injections, even in controlled circumstances as in camps, caused a vigorous search after something better. Levaditi and Sezarac (1921) conducted extensive experiments and recommended Sodi et Potassium Tartarobismuthate. Here again it may be mentioned that Balzaar (1899) first investigated experimentally if Bismuth could be used for syphilis. Severe reactions in dogs made him abandon the drugs. Robert and Santon published (1916) results in fowl spirillosis. This stimulated laboratory and clinical investigations of Bismuth, resulting in the valuable discovery of a powerful second weapon against syphilis. Kolle found that Bismuth acted better intramuscularly than intravenously. Klauder, Lumholt, Milian, have tested and discussed the pharmacological effects and toxic reactions. Mercury has fallen into the background, taking its place as an occasional substitute for bismuth or only where bismuth is not available. But mercury is still worthy of a place for oral treatment during the intervals between more vigorous courses of injections. Bismuth has come to stay. Numerous preparations of bismuth, watersoluble, liposoluble, insoluble preparations, and metallic bismuth are in the market and their popularity with the medical profession seems to be varying with the latest reports. The mechanism of action of the spirochaeticidal activity of Hg, as well as of Bismuth is still not very clear. With regard to the therapeutic index, Milian has graded the drug as follows: As: Bis: Hg—10:7:3.

Therapeutic Malaria.

As Rudolf observes "Few chapters in the history of medical discoveries are more romantic than those which tell of the cure of one disease by the aid of another." In a historical review, it is mentioned that Hippocrates observed the cure of epileptic fits by means of malaria. About 1887, Wagner Jauregg, impressed by the fact that literature contained reports (covering nearly a hundred years) of cases of remission in Paretics, suggested that artificial malaria should be tried in these cases. But it was not until 1917, that he put his suggestions, into practice. In the interval he had made a trial of other injections, of milk, of egg-albumin, peptone, Tuberculin, T. A. B. Vaccine, Relapsing fever etc. With the conclusion of the great war, the new method treatment for a disease till then considered beyond all hope of recovery, rapidly became popular and the third decade saw a large output of literature in this field, establishing indications, and improving the technique as well as the subsidiary methods of treatment. Apart from G. P. I., even cases of Tabes and other forms of neurosyphilis are treated sometimes with malaria. Suggestions have been put forward advocating malaria as a sort of preventive inoculation against the possibility of Neurosyphilis. Wagner Jauregg has given a

fresh lease of hope and life to Paretics and he deserves, not only the Nobel Prize but also enthronement in the heart of humanity. One fact must not be overlooked, however. Specific drug treatment must precede and succeed the malarial treatment. As natural corollaries, of the new method of attack, noval therapeutic agents have been recommended. Hot water baths, Diathermy, High frequency currents, and artificial climates, are coming into fashion for curative as well as preventive effects, against neurosyphilis.

Tryparsamide.

Jacobs and Heidelberger, while studying the relationship between chemical structure and biological action, were led to work with pentavalent arsenicals. One of the most interesting and highly trypanocidal of these compounds is now known as "Tryparsamide" and was prepared about 1919 by the workers. Brown and Pearce have thoroughly studied the toxicity, trypanocidal and spirochaetecidal properties. It seems to possess the power of tissue penetration to a marked degree, though the name of the drug has not penetrated beyond the walls of the Medical Colleges in South India. The drug has been highly extolled in all forms of Neurosyphilis and particularly as a preparatory treatment to Malarial Therapy. Bismuth and Tryparsamide have been brought together into one compound as "Bismuth Tryparsamide," with the same objects in view as that in the preparation of "Bismarsen," namely, reduction of the number of injections to which the patient has to be subjected.

Social and Medicolegal Aspects.

Anything more than a brief reference to the Social and Economic aspects of Syphilis, on which is founded the attention of the educated public of all countries, is not possible in this article. Local, National, and International organisations have sprung up to promote diffusion of knowledge on matters of social and sexual hygiene and to impress both on the public and on the State the desirability of early treatment and prophylaxis of syphilis in relation to the individual, to his family, and to the state. The public health aspect of this 'Third Plague' is causing a great deal of commotion in different countries especially with regard to compulsory notification, compulsory examination of prostitutes, compulsory prenuptial medical certification etc.

International Co-operation.

As in post-war politics, international spirit is the key-note of the present day, at least in scientific matters. The League of Nations has interested itself in this branch of medicine also, though not to an extent proportionate to the importance of the disease to the health and economic welfare of the present generation and the future of the human race. The most discussed subjects among the syphilologists within the last few years may be said to be two, namely, the value of different serological tests and the efficacy of the numerous 'Plans' of treatment. Every nation and every continent had their own favourite test and scheme of treatment. The League of Nations called for a Conference of Serologists from all over the World and the results of the three conferences (1923,1928, 1930) are now before the public. The final conclusion of all the numerous investigations and discussions seems to be that one Complement Fixation Test and one Precipitation test must be done as a minimum, before diagnosing syphilis. The League Conference on the Standards of treatment has met but adjourned calling for data from every part of the world before arriving at a definite scheme, on a Universal basis. Progress in these efforts, will naturally be slow but "well begun is half done."

Literature on Syphilis.

From the beginning, syphilis has portentous mass of literature. Apart from the various National Journals on Dermatology and Syphilology, or those exclusively devoted to Syphilology or venereal diseases, there are valuable exhaustive studies, historical, statistical, experimental, chemotherapeutic, pathological, bacteriocal, serological and clinical, published by leading medical Journals, of all countries. Annual con-

gresses of National Societies, or Associations, and International Congresses on the various Medical Specialities, produce reports which are as heavy on account of the number of communications as the opinions expressed by the eminence of the writers. Books on syphilis are becoming veritable encyclopœdias in range. Day was when Syphilis was allocated a few paragraphs in a part of a chapter in medical textbooks. The disease was then raised to the status of having a chapter for itself, at least, in textbooks on Dermatology. Handbooks on Syphilis became the fashion later on. FOURNIER may be said to be one of the earliest to write on the special phases of the problems of Syphilis. The dawn of this century witnessed authoritative monographs on subjects like 'Spirochaetes', Congennital Syphilis, etc. "A system of Syphilis" by D'ARCY POWER and MURPHY (1906) was perhaps an admirable effort to bring within the easy reach of a G. P. all the latest facts. Later Reports on Wassermann reaction, on Salvarsan therapy, on Therapeutic Malaria, on G. P. I., formed voluminous contributions. Great studies have been published on cardiovascular and nerve syphilis and on syphilis of bone, of liver, of stomach, etc. The latest attempt to codify all available knowledge on the subject has been undertaken with remarkable success, in Germany by Prof. J. JADASSOHN, the greatest living authority on Dermatology and Syphilology, and in France by Prof. JEANSELME, the distinguished successor of FOURNIER as Professor of Dermatology and Syphilology at Hospital St. Louis. The German work has been done in collaboration with the leading Syphilologists of Europe and the 18th volume has been reviewed as "a monumental Encyclopedia on Skin and Venereal Diseases...a veritable mine of Knowledge." The French publication "Traite de la Syphilis" in 7 volumes, is still in the process of completion, the two volumes that have so far appeared being described "as worthy of Prof. JEANSELME and his collaborators who, in the performance of this task, are maintaining the best traditions of the French School." Apart from all these special works on the subject, every branch of Medicine touches the fringe of syphilis or rather syphilis spreads its tentacles into every known branch of medicine. Nearly every book in "Recent Advances" Series, that deals with clinical specialities, contains a brief consideration of Syphilis in relation to the particular branch. The more one studies the subject, the more he becomes impressed with the wisdom of OSLER'S dictum, "Know Syphilis in all its manifestations and relations and all things clinical will be added unto you."

THE FUTURE OF SYPHILIS.

FOURNIER remarked with reference to the successive stages of Syphilis that "the present is in no way the mirror of the future" and even a casual glance at the past, seems to forcibly bring to one's mind that the remark is equally true of the natural history and treatment of the disease. During the last hundred years, much newer knowledge has been gained, more powerful weapons against the disease forged and perfected, yet one knows very little about the numerous aspects of the malady. As JEANSELME points out there are still many gaps existing in our knowledge, such as the impossibility of securing a pure culture of Sp. Pallida, the failure of experimental syphilis to explain the mechanism of Congenital Syphilis, and the failure of attempts at vaccination as well as of serotherapy. STOKES'S inspiring address contains many stimulating speculations regarding the future of Syphilology. Diagnosis must be anticipatory and preventive instead of dilatory and consequent. Treatment must be simpler and shorter than at present but effective. The techniqne must be such that the general practitioner can handle it and the patient will follow it. Perhaps the treatment of syphilis, going in a circle, is coming back to the starting point—oral administration.

Is it possible to wipe out the disease? "Yes" says STOKES, the Director of International Research on Syphilis. He has a glimpse behind the final veil, and has a vision of "the altar on which the sacrificial monster of syphilis shall be immolated to the glory of medicine and the exaltation of the public health." And how is this consummation to be achieved? Our only hope lies in organised and systematic co-operative **research in Syphilology.**

Rœntgenological Study of A-typical Non-traumatic Bone Lesions.

By Capt. P. B. MUKHERJEE, B.Sc., M.B., D.M.R.E. (Camb.), F.R.C.S. (Edin.).

I. Non-traumatic bone lesions fall under the following heads:—

1. Developmental Anomalies.
   - (*a*) Anomalies of Size.
     - (*i*) Congenital absence of some bones. (Partial absence or complete absence).
     - (*ii*) Congenital small size of some bones.
     - (*iii*) Atrophy of bone.
   - (*b*) Excessive and ill-regulated growth.
     - Gigantism: (general).
     - Acromegaly: (local).
2. Inflammatory diseases.
   - (*a*) Pyogenic. Periostitis } Acute, Subacute, Chronic.
     - Osteomyelitis { Acute / Chronic
   - (*b*) Tubercular.
     - Periostitis. { Localised { Atrophic / Hypertrophic
     - Osteomyelitis. { Generalised { Atrophic / Hypertrophic
   - (*c*) Syphilitic.
     - Periostitis.
     - Subperiosteal and endosteal new bone formation.
     - Para Epiphysitis.
     - Osteomyelitis.
   - (*d*) Typhoid Osteitis.
   - (*e*) Pneumococcal infection of bone.
   - (*f*) Gonococcal Infection of bone.
   - (*g*) Arthritic conditions which occur in association with scarlatina, measles, dysentery, etc.
3. Neoplastic diseases of bone.
   - (1) Benign Growths.
   - (2) Malignant Growths.
4. Dystrophies or diseases of doubtful Pathology.
   - Rickets.
   - Scurvy (Barlow's Disease).
   - Osteitis Fibrosa Cystica.
   - Osteitis Deformans (Paget's disease).
   - Osteomalacia.
   - Osteogenesis Imperfecta (Idiopathic Psathyoris).
   - Fragilitas Ossium (osteo-psathyrosis).
   - Pulmonary Hypertrophic Osteo-Arthropathy.
5. Cysts of bone.
   - Simple.
   - Hydatid.
6. Apophysitis:
   - Schlatter's disease, Kummel's disease.
   - Perthes disease, Calcanean Apophysitis.
   - Kohler's disease, Iliac Apophysitis etc.

Typical cases of these diseases conforming to their usual pathological manifestations produce roentgenograms from which the diseases are diagnosed without much difficulty and error. When the pathology, however, does not run its usual course and skiagrams are obtained which do not conform to normal types—their interpretation causes anxiety and a definite diagnosis is arrived at by combining the results of clinical and roentgenological examinations with other laboratory findings. As it will not be possible for me to consider the typical cases of all these disorders from a roentgenological standpoint within the short space of time at my disposal, I propose to take up the study of the diseases that fall under group 2, *i.e.*, atypical cases of inflammatory bone lesions and indicate the lines of approach to their proper diagnosis. It should be remembered that the correct interpretation of roentgenograms depends to a large extent on the knowledge possessed by the interpreter of the pathological changes which are registered on the roentgenograms. Before, however, the pathological changes that take place in inflammatory bone lesions can be mastered, it is essential to review briefly our knowledge of the normal anatomy of bone, its development, its blood supply, the roentgenographic appearances of its constituent parts and the variations produced therein by diseased conditions.

Normal bones are composed of several highly organised structures having different functions. Some of these are plainly visible on an X-ray film, while others are demonstrable only when they are in a pathological state. The normal constituents are: the periosteum, the cortex, the medullary canal, the cancellous bone at the ends covered with articular cartilage, Nutrient foramina, and in growing patients the epiphyses and the epiphyseal cartilages. Of these constituents it will be remembered the periosteum and the cartilaginous structures in their normal state do not throw any shadow on the X-ray films; whereas the medullary canal appears as a cylindrical hollow channel as its contained elements being radiotransparent do not also cast a shadow. The region of bone which is of the greatest importance to a study of its inflammatory lesions is the metaphysis *i.e.*, that region of cancellous bone which lies between the medullary cavity and the epiphyseal cartilage. This portion of the diaphysis possesses certain peculiarities two of which are of great practical importance. Firstly, it is the most vascular portion of the bone and secondly, it is the common site for the development of many of the inflammatory diseases. The second peculiarity is probably dependent on the first. Viewed from the pathological standpoint the method of blood supply of bones is of considerable practical importance. The typical method of supply is as follows: The nutrient vessel bearing the main blood supply enters the shaft of the bone about the middle. The orientation of the vessel at its entrance is found to be wonderfully constant and there are some who claim that the direction is an important factor in the subsequent localisation of inflammatory disease. From the knee and towards the elbow is the scheme of distributions.

Having entered the bone the vessel breaks up into two divisions which are respectively directed towards the opposite extremities of the bone. At first the groups are arranged as a leash of vessels, but as the extremity of the bone is reached, they subdivide into a complex anastomosis of thin walled spaces. A second series of vessels passes into the bone from the neighbouring joint. At the extremities of each joint there is a vascular ring localised in the perisynovial tissues (the circus vasculosus) and from this vessels pass into the interior of the bone to open either in the epiphysis or in the metaphysis. If the vessels from the joint anastomosis pass into the metaphysis they are spoken of as juxta epiphyseal or Lexer's arteries—they form the distribution which occurs when the ligaments and the synovial reflection of the related joint extend so as to include within their attachments the epiphysis, the epiphyseal cartilage, and the metaphysis. If it happens that the joint connection does not extend beyond the epiphysis—the vessels entering the bone are termed epiphyseal vessels; their connection with the metaphysis is only secondary after extending through the epiphysis and the epiphyseal cartilage. The scheme of blood supply of the bones is completed by the subperiosteal distribution. There are thus four sources of blood supply: Nutrient, Juxta epiphyseal, epiphyseal, and periosteal and of these the three first mentioned ultimately anastomose in the metaphysis. The metaphysis is thus a large catchment area in the distribution of the blood to the bone and it would be difficult to exaggerate its practical importance. All bones are, however, not supplied on the same scheme. Short long bones usually possess a single epiphysis, and the vascular distribution is altered accordingly. Each of the flat bones is supplied by a nutrient vessel, and the periosteal vessels are of greater importance than in the long bones.

In considering now the factors which localise the infection in the bone, if we assume that the organisms which produce the inflammation are originally circulating in the blood stream there must be one or more factors which lead to local deposit and further development. The factors are (1) the vascular arrangements in the metaphysis and the influence of trauma in some form. In the metaphysis we have a vascular zone in which the anastomosis is of a tennous and almost sieve-like character—any circulating product is therefore liable to be delayed in this situation. The second influence that of trauma—is possibly the ultimate deciding factor in localising the area in which the deposit occurs. The trauma is most frequently a blow. Its effect is to produce a slight hæmorrhage, or at least a retardation of the blood stream, in a local area. In this prepared site a deposit of the circulating organism occurs and infection is the result.

Coming back now to the pathological side of the picture we know that pathological conditions in bone give rise to three processes: that of (1) bone proliferation and new bone formation, (2) Rarefaction or bone destruction, and (3) Bone atrophy or loss of calcium salts. The rarefaction may be limited or widespread, the bone productions may be confined to the bone itself or, as in the malignant lesions, it may invade the surrounding tissues. In some instances cysts may develop in bone and they may be caused by a variety of diseases. It is very unusual for only one of these processes to be present, but often a combination of only two of them may result. For a long time a definite conformation and appearance of these pathological changes on the roentgenogram have been described as typical of infections and have served as the criteria of differentiation from other diseases.

Pyogenic Osteomyelitis: It is well-known that for the first few days, (7—10) of an acute pyogenic osteomyelitis no abnormality is found in the roentgenogram. After this period pyogenic infections of bone cause, first, destruction of bone followed by repair, the destruction predominating in the acute stage before systemic reaction is sufficiently established to start reparative and formative changes. The destruction means necrosis of bone and the formation of sequestra, with new bone or involucrum surrounding the individual sequestrum. The characteristic roentgen appearances which differentiate a *pyogenic* from other infections are the very widespread and very irregular nature of the bony changes seen at all stages of the disease, and in the later stages the excessive irregular sclerosis and new bone formation. But often instead of sequestration there is hardening and thickening of bone with a comparatively small central area of destruction. These cases take the form of Brodie's abscess:—

Tuberculous infections: Very early tuberculous infections produce no radiographic data for diagnosis. Later, it is usual to see a rather localised general rarefaction of bone with loss of detail, the latter phenomenon being much more conspicuous than the former. The most common type of fully developed tuberculous osteitis presents the appearance of a purely destructive inflammatory lesion. Extensive necrosis and abscess formation result in the advanced stages of the disease but the actual area of bone involved is comparatively small (for example, the head and neck of femer may be completely destroyed while the upper end of shaft shows little change—a state of affairs never seen in the pyogenic infections of bone). New bone formation is very slight or even absent; it is seen only when healing process is well advanced. This is the type of tuberculous disease so commonly seen commencing in the metaphyseal areas of long bones and subsequently involving the adjacent joint, the articular extremities then undergoing destructive changes similar to those in the metaphysis. The new bone formation in the healed lesion is compensatory rather than excessive. The second type of tuberculous lesion, much less common than the destructive form described above, is what is clinically seen as "Spina Ventosa," affecting the metacarpals, the metatarsals, the phalanges and bones about the elbow joint. It also occurs as an isolated lesion of the long bones, especially the ulna. The radiogram shews subperiosteal new bone laid down in successive orderly layers. Sometimes this is the only abnormality seen, when it is indistinguishable radiographically from syphilitic periostitis. In the typical tuberculous lesion a central abscess cavity indicates the primary focus of infection. Syphilitic disease of bone has the following manifestations in both the congenital and the acquired disease:—Chronic periostitis, Localised gumma, and diffuse gummatous infiltration. The first type extends over a wide area and in the long bones produces a regular spindle shaped swelling due to successive layers of subperiosteal new bone. The regular nature of the periostitis, and the absence of destructive changes in the underlying bone in such an extensive lesion are typical of a syphilitic infection. A localised gumma, in the early stages, produces a localised destruction of bone with no well-defined limitations; the periosteum of the part is raised and thickened and is visible as a faint linear opacity without definite new bone formation. In the active stages of diffuse gummatous infiltration there is a widespread very irregular destruction of bone with formation of new bone which is also very irregular. Areas of sclerosis are seen in the later stages only. The late stages of localised or diffuse gummatous disease manifest themselves as sclerosis and hyperostosis, often so marked as

to completely obscure the bony structure. This sclerosis is particularly prone to encroach upon medullary canal. It is generally far more regular than the sclerosis of pyogenic or tuberculous infections. Post-typhoid infections of bone shews a very chronic periostitis with regular new bone formation in the centre of which lies an abscess cavity with well-defined margins and very little surrounding sclerosis. Much less commonly is seen a localised osteomyelitis or an atypical periostitis.

While the above represents the characteristic radiographic appearances of the different varieties of inflammatory lesions of bone, we occasionally come across cases which give radiograms of a transitional or variant type, the appearances of which are very difficult to recognise. These radiograms resemble more the accepted typical pictures of some other disease than of osteomyelitis.

Tuberculous and pyogenic osteomyelitis have often produced similar roentgen appearances. Brodie's abscess has been simulated by both these diseases. The wedge-shaped areas of rarefied bone with varied degrees of cortical thickening and with their bases toward the articular extremities of the bones have been found in both conditions. Cases of tuberculous disease of bone have been reported which shewed definite involvment of the shaft with little or no extension to the epiphyseal line and the articulation. Roentgenograms have been obtained in the chronic forms of pyogenic osteomyelitis when the process has become almost, if not completely a formative one—shewing marked periosteal new bone formation with more or less narrowing of the medullary canal and new bone laid down parallel to the long axis of the shaft—a picture which suggests the proliferation or hyperostotic form of syphilis. The skiagram of an acute pyogenic periostitis often resembles that of syphilis and the symptoms of acute inflammation may not be marked. Some cases of congenital syphilis have yielded radiograms with rarefied punched out areas in the diaphyseal ends of bones similar to those sometimes seen in pyogenic osteomyelitis situated near the diaphyseal ends. I have seen roentgenograms of tuberculous disease affecting the shafts of long bones which have been very difficult to differentiate from syphilitic disease affecting the same. Other diseases of bone which occasionally produce roentgenograms simulating those of inflammatory diseases are certain types of osteogenetic sarcoma, the early stage of periosteal sarcoma with slight bone destruction and invasion of cortex, endothelioma of bone or EWING'S tumour, metastatic carcinoma, infantile scurvy, and cystic diseases of bone (the localised chronic cystic osteitis as well as the generalised fibrocystic disease).

In approaching the subject of differential diagnosis of these conditions and in formulating a practical and workable scheme for the same purpose, it is necessary for us to remember a few fundamental facts bearing upon the pathology of the conditions which we are studying. Briefly mentioned they are as follows:—

(1) Pyogenic osteomyelitis begins as a focus of acute inflammation in the vascular marrow of metaphysis in the juvenile group whereas in adults it may start anywhere in the bone; tuberculous disease of bone may begin in the middle of the diaphysis (*e.g.* in tuberculous dactylitis and tuberculous disease of vertebræ and more rarely in tibia or ulna) or it may affect the extremity of the bone in the metaphysis or in the epiphysis. The metaphysis is, however, the common situation. Tub. diaphysitis is practically confined to the earlier years of life, because it is during this period that the nutrient vessel is the main source of blood supply. After growth has ceased the periosteal vascular supply becomes of greater importance than the nutrient and there is a corresponding fall in the incidence of Tub. diaphysitis. Tub. lesion in a bone may commence as a Tub. Epiphysitis but only under exceptional conditions, the most common being secondary infection extending from a related infected joint. Syphilis on the other hand affects the diaphysis of long bones rather than the articular ends.

(2) While a considerable proportion of Tub. bone disease is primary in so far as it is the original manifestation of the disease in the osseous system, a certain number of cases are secondary to Tub. infection of an adjacent joint, the infection spreading along the metaphyseal vessels in the perivascular tissues. The latter may happen in pyogenic osteomyelitis also, but in Tuberculosis the liability of the joint to infect the bone is more marked on account of the following two reasons: (*a*) The bone which is related to a

tuberculous joint early undergoes a fibro-myxomatous change and therefore becomes liable to a secondary infection, and (b) if the disposition of the bone is such that its metaphysis is within the zone of synovial reflection the diseased synovial membrane is in close vascular relationship to the underlying metaphysis.

(3) The method of spread varies in different infections. The suppuration of pyogenic infections readily passes through the open structure of the cancellous metaphysis, down the medullary cavity, along the surface under the periosteum, and from the surface to the marrow via the Haversian canals. The epiphyseal cartilage appears to present a formidable barrier to the spread of the infection, so that, even although the disease frequently commences in the metaphysis, infection of the joint is a comparatively rare occurrence. Tuberculosis behaves in just the opposite manner. The process, again, usually commencing in the metaphysis from infection of a paraepiphyseal blood clot, remains fairly well localised with little tendency to spread down the medullary cavity, but invasion of the joint is the rule rather than the exception. This invasion takes place either by passage through the epiphyseal cartilage and the epiphysis or by raising the attachment of the capsule to the end of the epiphyseal cartilage. Involvment of joint is very seldom seen in syphilitic diseases of bone.

(4) The process of destruction and sclerosis go hand in hand in all inflammatory conditions of bone; but the relative proportion vary greatly in different cases. In tuberculosis in which caries is always well-marked, sclerosis is seldom a prominent feature; in syphilis, on the other hand, the slowly acting spirochætes usually call forth an excessive amount of new bone formation. In pyogenic osteomyelitis, as we have already observed, destruction is the feature in the early stages whereas new bone formation rules the picture when the process has become chronic.

(5) In pyogenic osteomyelitis the long bones are most frequently affected, particularly the upper and lower ends of tibia, the lower end of femur and the upper end of humerus (although we must not forget that almost every bone may occasionally be involved, even the vertebræ). The most frequent victims to tuberculosis on the other hand, are the ends of the long bones especially tibia and femur, the short long bones, the short bones of carpus and tarsus and the vertebræ. The bones most commonly involved in syphilis, are the tibia, the sternum, the skull and the bones of the face. The spine, especially the cervical portion is also sometimes affected.

(6) Osteomyelitis has a tendency to destroy the bony cortex in somewhat scattered areas whereas malignant tumours of bone destroy it emmasse, with no intervening scattered areas of normal cortex. In this connection it should be remembered that a malignant tumour in a long bone starts from one central point and radiates equally in all directions, absorbing the bone as the growth advances, but never appears as separated areas with normal bone in between and never produces sequestra. Furthermore when the growth reaches the cortex it destroys the latter completely as a whole and not in parts as osteomyelitis does.

(7) The periosteal new bone formation in inflammatory diseases is generally laid down parallel to the shaft whereas in bone-producing malignant tumours the new bone is laid down perpendicularly. It should, however, be remembered that absolute dependence cannot always be placed on this sign, as in some cases of osteomyelitis perpendicular striations of new bone have been observed especially in syphilis.

(8) Solitary diffuse endothelioma of bone has been mistaken for osteomyelitis. Ewing states that this is a relatively frequent and quite specific disease which has often been unrecognised and has passed for round cell sercoma of bone. His description of this disease is worth quoting:—

"Most of the cases that I have seen have been in young subjects, 3 of them 14 years of age, the oldest 19 years. The disease begins without assignable cause, with attacks of pain aggravated by exercise, but not very severe, so that the patient is able to go about for weeks or months. A spontaneous fracture may occur early. A diffuse swelling slowly forms over the affected bone, and a tumour tissue involves the soft parts. Fluctuations in the size of the tumour may then be noted. The growth is comparatively slow, several months elapsing before the external swelling demands attention. At this time the radiograph shows a smooth diffuse rarefaction of a large portion of the shaft of the bone, the outlines of which are widened. The location in the shaft rather than at

the end of the bone and the absence of bone production distinguishes the condition from osteogenetic sarcoma." These tumours respond rapidly to Roentgenary and Radium treatment but the ultimate outcome is fatal. This regression under irradiation is of diagnostic assistance.

(9) Occasionally during the rarefied early stage of osteomyelitis with a very ragged appearance of the periosteum the appearance may resemble that of metastatic carcinoma; but the history and clinical signs and symptoms help in different diagnosis.

(10) Infantile scurvy with the clinical picture of a fretful, miserable child with swollen sometimes reddened joint, marked pain and tenderness on movement and elevation of temperature, may resemble early stage of acute osteomyelitis. If it is the latter in the very early stage there will be no demonstrable bone changes in the roentgenograms whereas in the later stages periosteal change with some rarefaction and destruction may be found. In the early stages of scurvy, however, the radiograms will shew the characteristic dense ring like shadow of the calcified matrix of the border of the epiphysis with the smooth ground glass appearance of its centre, the same ground glass appearance of its shaft, the calcified matrix of the distal end of the diaphysis with perhaps the scurvy-line of PELKEN, and the spurs at the diaphyseal ends of the bones which are the first signs of subperiosteal hæmorrhage and are due to the shoving out of the zone of preparatory calcification which is greatly weakened in scurvy.

(11) Due to the fact that osteomyelitis can cause change in bone simulating the appearance of bone cysts and due to the fact that occasionally these rarefied cystic areas may be multiple in character, difficulty may arise in its differentiation from the disease entity known as osteitis fibrosa cystica or chronic cystic osteitis. It should be remembered that the areas of lessened density in the latter disease are caused in part by the replacement of osseous tissue by fibrous tissue growth.

Localised chronic cystic osteitis occurs more often in the growing period of life; the usual sites for its appearance are the proximal ends of femur, fibula and humerus but cysts of the middle third of the shaft are by no means rare. The cortex is intact and has a tendency to expand in a fusiform or cylindrical manner. The area of rarefactions is sharply limited and has a definite outline, showing no invasion of the soft tissues. Cystic areas of osteomyelitis, on the other hand, are apt to have inflammatory thickening of the cortex and periosteum in the neighbouring areas. A thorough search should also be made for presence of a sequestrum. In osteomyelitis trabeculations are usually absent while in cystic disease they are often present. The ultimate dependence in the differentiation between these two processes lies, therefore, upon the extent of evidence of inflammatory manifestations; thickened cortex, periosteal proliferation and sequestrum formation.

Generalised fibrocystic disease presents a very typical roentgenogram. Several long bones are usually affected, marked deformity due to bowing occurs, and the cortex is expanded and thinned. Within the medullary cavity are large and numerous rarefied areas. The normal bone detail is replaced by irregular strands of trabeculæ. As in osteomyelitis there is sometimes actual lengthening of the bone. It seems that this combined with the clinical picture should give no difficulty in the different diagnosis. The problem in these cases is not so much that of differentiation from pyogenic osteomyelitis as it is that of differentiation from syphilis. The history, the wasserman reaction, and the therapeutic test should settle the matter.

If these fundamental facts about the pathology of bone lesions are remembered and their knowledge is brought to bear upon the interpretation of roentgenograms which they produce the different diagnosis of even atypical lesions as registered upon X-ray films will not be a difficult matter.

*Paper read at the Scientific Section of the VIII All-India Medical Conference held in Calcutta, March, 1932.

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Editorial Comments

Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S.

RONALD ROSS has passed away. He died in his seventyfifth year of an illness of several weeks' duration in London on September 16, 1932. Born at Almora in the Kumaron Hills, U. P. on May 13, 1857, three days after the Sepoy Mutiny

had broken out, he was taken to England for his early education. He took up the study of medicine, much against his will, at St. Bartholomew's Hospital, London and in 1881 entered the Indian Medical Service.

It was in 1892 that he launched into a series of investigations about malaria. On August 20, 1897, while a mere Captain in the Indian Medical Service, ROSS, working, in the Military Hospital at Secunderabad with untiring energy and firm determination on a pertinent suggestion from SIR PATRICK MANSON regarding the possibility of malaria-transmission by mosquitoes, against insurmountable difficulties such as want of laboratory assistants, scientific books or periodicals, financial aid, and over and above against official apathy, discovered the presence of malarial parasites in the stomach of a mosquito fed on the blood of a human patient with the aid of a rusty microscope whose "last remaining eyepiece was cracked." A month later, in midst of his subsequent confirmatory experiments he was ordered off to Rajputana on regimental duties. But nothing could extinguish the fire of that zealous and heroic soul. In 1898, as a Surgeon Major, ROSS was transferred to the Presidency General Hospital, at Calcutta, where he achieved the crowning glory of his life by experimental confirmation of transmission of malaria from bird to bird by mosquitoes fed on malaria-infected birds. His discovery has undoubtedly created an epoch in the history of malarial Epidemiology by a practical contribution to the successful solution of the problem of malaria-prevention.

As an appreciation of his valuable work in the cause of suffering humanity he was awarded the Nobel Prize for Medicine in 1902. In late life, he was the recipient of numerous honours from the King as well as from scientific societies all over the world. In ROSS, we have lost a great scientist, a poet and above all a great friend of India. Let us hope the Ross Institute, of which he was the Director-in-Chief during the last few years of his life, will bear an everlasting testimony to the greatness of the departed soul.

* * * * *

Epidemic Dropsy.

Calcutta is passing, since last July, through another out-break of Epidemic Dropsy characterised clinically by low intermittent fever, diarrhoea, œdema, chiefly of the lower extremities associated with signs of circulatory failure. No

evidence of motor or objective sensory disturbances that characterise Beri-Beri, has, however, been found.

The first authentic report of Epidemic Dropsy was published by MCLEOD from Calcutta in 1877-78. As in the previous epidemic of 1926, the northern wards of the city are suffering more severely in the present one than the other parts. The general mortality rate is, however, lower than on previous occasions. The incidence of the disease is equal on members of both sexes, but infants are escaping.

The etiology of the disease still remains unsolved. Various theories have been propounded, some on scanty experimental basis, others on epidemiological and clinical observations. None of them are convincing. GREIG looked upon Epidemic Dropsy as a modified form of Beri-Beri *e.g.* ship Beri-Beri. ACTON and CHOPRA regard Epidemic Dropsy and Beri-Beri as different clinical aspects of a syndrome due to ingestion of toxins formed in damaged rice by some spore-bearing bacillus. Others regard it akin to war-oedema due to deficiency of fats in the dietary. Some others again think that deficiency of calcium might play a part. Others again are, however, inclined to believe that the disease is an infectious process, the unknown organism gaining entrance into the body through the *prima vie* and probably developing there under the helpful influence of long continued rain and high humidity.

As clearly demonstrated by Dr. M. N. DE, the morbid anatomy of the disease is characterised by wide-spread dilatation of the capillaries throughout the body, particularly those of the myocardium, subcutaneous fatty tissues, intestines, lungs, endometrium, cervix uteri and ovaries. Serous effusions in pleural, pericardial and other serous cavities have been found. The suprarenal of one in a series of 4 cases, has been reported by him to have presented infiltration with lymphocytes and polymorphonuclear cells.

Clinically most cases show the symptom-complex of oedema of the feet, diarrhoea and low intermittent fever at some stage of the disease or other. In a series of 18 cases, in the Carmichael Medical College Hospitals, under DR. B. C. ROY, the maximum temperature noted was 102° F. in one : in the rest, the temperature varied between 99°5 F. and 101° F. Diarrhoea was the initial symptom in 6 cases. Aching pains in the neck and back were the initial symptoms in one case only. Vomiting was rare. Oedema was nearly always present, starting from the lower extremities and gradually spreading over the entire body. In 2 of the 18 cases under review, small cutaneous haemangiomata were seen but they disappeared on recovery. Generalised erythema was occasionally observed.

Disturbances of the heart and circulation are frequent. Cases with constipation seem to suffer most from such disturbances. Breathlessness on exertion and palpitation are the most common symptoms. Even orthopnoea and cyanosis occur in a fairly high number of cases. Dilatation of the right heart is the commonest finding but undoubted enlargement of the left heart alone is not infrequent. The liver may be enlarged and tender in a few cases even in absence of the signs of congestive failure. The pulse is usually rapid and regular, though extrasystoles and auricular fibrillation may be met with. The blood pressure is low in uncomplicated cases of Epidemic Dropsy despite the few reported observations of high blood pressure. Pulmonary oedema is not infrequent in the later stages of the disease. Moderate degree of anaemia is usually present. In DR. B. C. ROY'S cases, the usual R. B. C. count was near about 2,500,000 mills per c. m. m. On the other hand DR. B. B. SAHA reported as low a count as 1,500,000 mills per c. m. m. The reported eosinophilia was not confirmed. Only 4 of the 18 cases showed eosinophilia above 2 p. c. but neither a history of asthma nor of intestinal worms ws definitely excluded. The albumin-globulin ratio of the blood was altered to 1 : 1 instead of the normal 3 : 1, though DR. C. B. ROY, in a previous paper, reported the ratio to be altered to 1 : 3.

The occasional appearance of haemorrhagic stools has been reported by some observers. Pregnancy before the fifth month may terminate

by abortion in the course of the disease. Inspite of the authoritative statement of MANSON-BAHR urine is diminished in quantity in most cases. The knee jerks are often normal, if properly elicited. Sometimes an exaggeration is noticed, more probably due to a psycho-neurotic tendency in the patient than to the disease itself. The occurrence of mild glaucoma has been reported in many cases.

The treatment of Epidemic Dropsy is a very intricate problem to deal with. Various modes of treatment have yielded equally beneficial results. Hence it is not possible to outline any dogmatic line of treatment in this disease.

* * * * *

Gastric Syphilis.

In spite of many recent contributions upon the incidence of gastric syphilis, it must be realised that the disease is extremely rare TURNBULL [1] of the London Hospital, could not find a single authentic case of gastric syphilis in a series of 13,000 autopsies. There was only 1 case of syphilis of the stomach amongst 316 cases of advanced syphilis in a series of 4880 autopsies at the Bellevue Hospital. The large number of cases of gastric syphilis that is being reported from time to time in recent literature, would not stand the test of a rigid standard of diagnosis. CHIARI, in 1891, laid stress on the histological evidence for diagnosis. TURNBULL however, points out that histological findings of infiltration with plasma cells, lymphocytes and eosinophils, or endarteritis or even giant-celled infiltration are not pathognomonic of syphilis. These changes may be found in an ordinary peptic ulcer. The demonstration of spirochaeta pallida in the walls of the ulcer is the only diagnostic evidence of its syphilitic nature. There are only two cases in record, one of MCNEE and another of WARTHIN [2] where spirochaeta pallida was demonstrated in the tissues of the ulcer. The remarks of HARTWELL is very apt on this point: "There is a world of difference between a syphilitic ulcer and ulcer in a syphilitic." Neither the radiological examination nor the Wassermann reaction can ever distinguish between the two conditions.

Clinically, the disease may present three groups of symptoms; (1) those suggestive of an ulcer, (2) those resembling carcinoma, (3) those with atypical symptoms. In the absence of the strict diagnostic standard mentioned above, the determination of gastric syphilis may be justified on the following grounds:

(1) No relief of the symptoms occur on a thorough trial of the recognised treatment for peptic ulcer, but rapid relief follows intensive antisyphilitic treatment without a strict dietetic modification.

(2) X-ray examination shows improvement or recovery.

(3) The Wassermann reaction turns out to be negative or less positive under antisyphilitic treatment.

The therapeutic test must not be continued however, for a long time.

The incidence of gastric syphilis is still rare, even when the diagnosis is based on the above mentioned criteria as will be evident from the fact that P. A. O'LEARY [3] of the Mayo Clinic, reports only 89 cases of gastric syphilis amongst nearly 25,000 syphilitic patients.

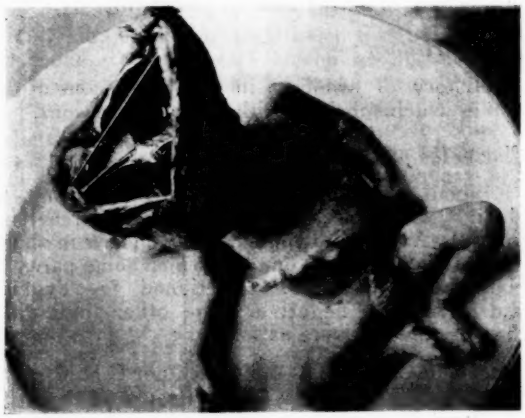
1 W. Boyd, Pathology of Internal Diseases.
2 New England J. Med. 205 : 1973, 1931.
3 Amer. Jour. Surg. 1931 Feb ; 286.

Case Notes

A Case of Congenital External Hydrocephalus.

H. N. RAY, M.B.

An interesting case of congenital external Hydrocephalus recently occurred at the Chittaranjan Hospital which we consider to be worth reporting in view of the rarity of this condition. The foetus was delivered by craniotomy as the labour was obstructed.



The obstetrical history of the case is as follows: The mother, a Mohamedan woman aged 38, was admitted to the Hospital on 11-3-32. She has five children, all alive and healthy and does not give history of any miscarriage or abortion. The previous obstetrical history was good. Her general condition on admission was normal, but she had a purulent vaginal discharge.

Pains started on the day of admission but were very sluggish. Membranes ruptured on the next day but the pains were still sluggish.

At 8 A. M. on 13-3-32 the condition was found to be as follows: The uterus was ovoid in contour and soft on palpation, the head which was big was felt movable over the brim and the breech was felt at the fundus. The foetal heart sounds were 145 per minute.

On internal examination, the os was found to admit 3 fingers (loose) and the presenting part was felt high up.

At 4 P.M. the mother's pulse wrs found to rise up to 140 per minute and the foetal heart sounds were found to be absent. A craniotomy was performed and more than a pint of clear cerebrospinal fluid came out of the head. Extraction of the child did not cause any difficulty.

The placenta was adherent and had to be removed manually. The puerperium is uneventful and the patient is progressing satisfactorily. She is still in the Hospital. The W. R. of the patient was tested on 21-3-32 and found to be negative. *Description of the foetus.* The weight of the craniotomised foetus was 5 lbs and the length was 22". The child looked fully developed. It didn't show any malformation except at the region of the head. The face was normal in appearance. The Bisacromial diameter measured 6" (15 C.M.). Bitrochanteric 3½" (9 C.M.). Certain approximate measurements of the head were obtained by trying to reconstruct the head as far as possible to its original dimensions. In this way the circumference of the head was guessed to be over 20"; mento-vertical diameter about 8" (20 C. M.), bitemporal (3½") 8 C.M., greatest width of the head about 6" (15 C.M.).

On minute examination of the specimen, the following condition is noticed.

The scalp is covered with long hairs which are normal in distribution. The individual bones of vault of the skull seem to be well developed.

The frontal bones are in contact in the region of the foreheads but are widely separated from each other in the neighbourhood of the ant. fontanelle.

The parietal bones do not lie far away from the frontal bones but are widely separated from each other and from the occipital and temporal bones.

On opening the skull a huge cavity is found inside. In the outer wall of this cavity no brain matter is discernible. The structure of meninges lie directly against the bone. The cavity occupies the whole of the ant. fossa and also almost the whole of the middle fossa of the skull cavity. The brain matter is chiefly crowded in the postcranial fossa and extends forward in the middle line towards the sella turcica displaying a hump-like prominence near its anterior end. This stem of brain matter is covered by a glistening membrane, looking like the meninges, below which some tortuous blood vessels can be seen here and there. Inside the skull cavity the falx cerebri is found in a medial position. It connects the stem of brain matter above referred to with the parietes. Anteriorly it extends as far as the anterior fontanelle. The bases of the anterior and the middle fossae present a normal appearance, and below the meninges the blood vessels are found running much in the normal manner.

Conclusion :—

For the present I wish to stop here. I am not in a position to say anything about the case. Investigation is still proceeding and further details will be reported later on. The case was

undoubtedly one of external hydrocephalus. It is not associated with any distension of the ventricles. So far nothing has been found to explain its aetiology.

A case of obscure Filarial Infection.

ANIL KUMAR CHAKRABURTTY, M.B.

Miss R. L. aged 36 years, resident of Calcutta, came to me on the 29th July, 1932 to have her blood examined for finding out the cause of her general run-down health and slow rise in her body temperature.

History of the case :—

Slow rise in temperature upto maximum 99·4, almost daily, during the last 2 years or so, commencing from some time after resuming her daily active work in the day, coming on slowly and remaing raised the rest of the day and coming down to normal the next morning. On the 19th of May, 1932, this slow rise had a sudden exacerbation and it went up to 101.F with severe headache and pain in the legs. She took her admission in a Hospital the next day where blood slides were examined but no Malarial Parasites were found. The next day a complete examination of the blood was done and it was anounced that the tests for Kalazar were positive. The case was accordingly, for the time being, diagnosed to be one of Kala-Azar. On the next day the patient developed diarrhoea, which continued for the next 5 days, with 4 or 5 stools a day with pain in abdomen, and the diagnosis was again temporarily revised and was made as Enteric. However on the subsidence of the diarrhoea the patient was again labelled as a case of Kala-Azar and 8 (daily) injections of Neo-Stibosan were given doses rangeing from 0.1 to 0.3 grms. All medicines were then stopped for two weeks and blood was twice examined during this period and the 2nd. examination showed, according to the opinion of the doctors, that the K. A. was cured. A week later another course of 8 injections of Neo-Stibosan were repeated, daily, although the blood picture, according to them, was negative to K. A. infection. Blood was again examined twice during this period but did not reveal anything in particular.

There was history of pain in the legs and thighs all along the period while the patient was in the hospital. There was no history of any Lymphangitic attack having been discovered by the doctors at the hospital. The patient was discharged from the hospital after the pain and the temperature had mostly subsided.

Previous History :—

During the last two years the patient has been suffering from a sense of tired feeling in the lower extremities after a long walk although she was used to long walks and was of very active habits previously. No swelling was ever noticed by her in the legs or over the veins or lymphatics or lymph glands. There is no history of fever coming on with rigors or any particular periodicity as to its onset. There has not been any other sign or symptom noticed suggestive of Filarial Infection.

Physical Examination :—

Physical examination do not show anything suggestive of active Filarial infection.

Family History :—

History of swelling in the legs of one of her sisters which subsided with Soamin injections.

Clue to the present Diagnosis :—

Blood was taken on the 29th morning at about 9 A.M. for Counting and Serum reactions for Kala-Azar and Typhoid. Two smears on slided were taken and in one of which some parasitic bodies were detected. Reactioned for Typhoid and K. A. were negative. The other findings of the examination were as follows :

Total R.B.C.	...	4,800,000. per C.M.M.	
Total W.B.C.	...	12,000. „ „	
Haemoglobin Value		70 %	
Poly morphs	...	74 %	
Small Monos	...	16 %	
Large Monos	...	*Nil*	
Eosinophiles	...	10 %	No Malarial parasites could be detected.

Three Micro-Filarias were found in one slide having already been stained. Suspecting the Filariae to be of the Diurnal variety, 4 specimens of thick fresh drops were examined the next afternoon but no Filaria was found in any one of them. This type of examination was again repeated the same night at about 11-30, P.M. and Mioro-Filariae were again discovered.

This accidental finding of Filaria in the slide taken for differential count of Leucocytes gave the clue to further searches and a real diagnosis of the cause of the long continued fever was made which was so obscure so long though repeated blood examination was done in a big and well renowned hospital in Calcutta. The exacerbation of temperature and pain was checked in the hospital by injection, though given with a mistaken diagnosis, was due to the Antimony in the solution, which is also a medicine for Filariasis.

The subsequent treatment of the patient has been suggested on the lines for those for Filariasis.

A Case of Rat Bite Fever.

CAPT. S. K. CHAUDHURI,
Chief Medical Officer, Benares State.

N. K. Hindu male, aged 25 years was admitted on August 22, '32 to the Lovett Hospital, Ramnagar, Benares State, with fever and a circular, sloughing ulcer, nearly two inches in diameter, at the lower end of left upper arm internally. The duration prior to admission was twelve days.

He said he had been bitten by a rat of moderate size while asleep at night. The pain was so severe that he woke up with start, he saw the rat jump off his arm and run away. The bite was followed by bleeding to stop which some home remedies were applied. Soon after, the axillary glands became inflamed and they subsided by the fifth day. The part bitten became indurated and painful and was soon covered over with a considerable amount of slough with a tendency to spread. The fever began, according to him, on the third day of the bite.

On admission to hospital on the twelfth day his blood was examined and nothing but malarial parasites (benign tertian) were found. He ran an irregular temperature on which quinine and cinchona, (the latter is used as a routine measure for malaria in this hospital) had no effect.

On the third day of admission *i. e.* August 30, 1932, Thiosar-mine 0·3 gram was injected intravenously. Twenty-four hours after the injection the temperature came down to the normal which has not risen since. The ulcer was treated with eusol and copper sulphate lotion.

IX All-India Medical Conference

An Appeal to the Profession.

It has been decided to hold the IX All-India Medical Conference during the ensuing Christmas holidays at Lucknow.

The Conference, as on previous occasions, will discuss many important problems concerning the welfare of the medical profession, besides affording an excellent opportunity not only of social intercourse between the different members of the medical profession in India but also of mutual exchange of ideas on various medical problems.

This session will be of particular interest and importance in view of the consideration of the Indian Medical Council Bill which is going to be taken up during the winter session of the Legislative Assembly. The whole-hearted co-operation and support of all medical practitioners in India are, therefore, invited in order to make the Conference a thoroughly representative one. It is sincerely hoped that all medical practitioners, all medical associations and societies throughout India will arrange to send a large number of delegates to guide the deliberations of the conference.

As in the previous sessions, there will be a Scientific Section, and it is up to the members of the medical profession in India to show that they are not lagging behind other countries in medical research. Members of the medical profession in India and the different medical associations and societies are earnestly requested to arrange for the contribution of scientific papers or case-notes, as was done on the last occasion at the Calcutta Conference. As the time is short it is requested that members would kindly inform DR. T. B. SWARUP, Secretary, All-India Medical Conference, Lucknow, if they are desirous of contributing papers or notes and to kindly forward a typewritten abstract of the paper which they intend to read by the 30th of November 1932. The original papers or case notes should be sent, if possible, by the 15th December, 1932.

We confidently hope that the response from members of the profession in regard to this Conference, will show to the world that the Indian Medical Profession is not in any way inferior to or lagging behind any other nation in upholding its own interest as well as in keeping up the high standard of research work.

Malaria Conference at Birnagar

District Nadia, Bengal.

(Held on Sunday, the 10th April 1932, at 3 p.m.)

PRESENT:

1. The Hon'ble Mr. B. P. Singh Roy,
   Minister, Local Self-Govt. Dept. Bengal, *President.*
2. Rai Bahadur N. Banerji, M.A., B.L.,
   Chairman, Birnagar Municipality.
3. Dr. R. B. Khambata, M.R.C.S., L.R.C.P., D.P.H.,
   Director of Public Health, Bengal.
4. Mr. T. C. Roy,
   District Magistrate, Nadia.
5. Rai Bahadur A. C. Mitra, B.E.,
   President, Birnagar Palli Mandali.
6. Dr. G. Bose, M.B., D.SC.,
   Chief Medical Adviser to the Mandali.
7. Lieut. Colonel A. D. Stewart, M.B., D.P.H. D.T.M. & H. F.R.C.S.E., I.M.S.,
   Director, All-India Institute of Hygiene and Public Health.
8. Kumar S. Singh Roy, M.L.C.
9. Mr. R. Senior White, F.R.S.E.,
   Malariologist, B. N. Railway.
10. Mr. J. N. Bose, M.L.C.
11. Mr. N. Mukherji,
    Zamindar, Birnagar.
12. Mr. S. M. Bose, Barrister-at-Law., M.L.C.
13. Rai Bahadur N. Mukerji, M.A., B.L.,
    Chairman, District Board, Nadia.
14. Dr. S. N. Sur, M.B., D.P.H., D.T.M.,
    Assistant Director of Public Health, Malaria Research, Bengal
15. Mr. J. C. Sen,
    Chairman, District Board, 24 Parganas.
16. Rai Sahib B. C. Roy,
    Sub-Divisional Officer, Ranaghat.
17. Mr. P. Ganguli
    Chairman, Local Board, Ranaghat.
18. Mr. R. Bhattacharji,
    Circle Officer, Ranaghat.
19. Dr. H. L. Banerji, M.B., D.P.H.,
    District Health Officer, Nadia.
20. Mr. S. K. Mukherji,
    Assistant Traffic Superintendent, E. B. Railway.
21. Mr. K. Bose,
    Honorary Secretary to the Mandali.

The Conference met at 3 p. m. In the morning the party had witnessed anti-malarial demonstrations of the Mandali, including application of Paris green in Chaka Bil from boats fitted with rotary blowers. Rai Bahadur A. C. MITRA, Senior Engineer, Messrs. Martin & Co., Calcutta, and President, Birnagar Palli Mandali, explained at the site of the Bil the project of re-excavating the Baromesia Canal for mosquito control in Chaka Bil—*Vide* Appendix A. The party also saw the exhibits of the Birnagar Malaria Research Laboratory, of which a list is given in Appendix B, and examined the records and statistics maintained by the Mandali.

On the motion of the Chairman, Birnagar Municipality, the Hon'ble Minister was voted to the Chair.

MR. K. BOSE, Honorary Secretary to the Mandali read the following Memorandum :

Memorandum on the proposed extension of malaria control work at Birnagar for discussion at the Conference.

The Anti-larval campaign.

The Birnagar Palli Mandali carried out a mosquito survey at Birnagar with the help of the Government Entomologists, Mr. M. O. T. Iyengar and Dr. P. Sur. Certain difficult points arising from our entomological work were solved by the Director, Malaria Survey of India and Colonel Sir. S. R. Christophers, Director, Central Research Institute, Kasauli.

Our researches have shown that out of 12 Anopheline species present at Birnagar (*Vide* list below), *Anopheles philippinensis* is the principal and for all practical purposes the only culprit against which our attack should be directed. Breeding places of this species within the municipal limits of Birnagar (2¼ Sq. miles) are being tackled for some years past and although our collections of adult mosquitoes show a gradual diminution of this species from year to year, there are reasons for believing that much of our good work is spoilt by influx of mosquitoes from outside our borders. Scientists lay stress on the point that anti-malarial operations should extend for a distance of at least half a mile beyond the periphery of the area to be controlled. This requirement could not hitherto be fulfilled for want of funds, except during 1931-32 when we took up the treatment of Chaka Bil on the south west of Birnagar.

It is a matter of great satisfaction that the Chairman, District Board, Nadia, made a grant of Rs. 800/- for an extension of anti-larval operations in Chaka Bil during 1931-32. If we are to extend our area of operation all round Birnagar as suggested above we shall have to deal with an area of about 8 square miles, instead of about 2¼ square miles. Our last year's expenses amount to a little over Rs. 7,000/- which was raised as follows -

By the Birnagar Palli Mandali	...	Rs. 3,200
By the District Board, Nadia	..	„ 1,000
By the Government of Bengal	...	„ 3,000

This income barely sufficed to meet the cost of our anti-larval and quinine campaigns in about 2½ square miles, and of our Laboratory work without which our anti-larval work cannot go on. We have already carried out a topographical survey of the area to be extended (5¼ square miles) and we have just taken up a larval survey of the breeding grounds in those regions. This is likely to be completed during 1932. It has been roughly estimated that we shall require Rs.6,000/- for anti-malarial operation in this area, including Chaka Bil. The total estimate of cost for the entire area to be treated viz. 8 square miles will come to about Rs. 12,000/-. It is suggested that the cost should be met by the authorities named below as follows :

By the Birnagar Palli Mandali	...	Rs. 3,000
By the District Board, Nadia	...	„ 3,000
By the Government of Bengal	...	„ 6,000
		Rs. 12,000

The League of Nations' Malaria Commission recommended that provincial Governments should establish demonstration

Fig. 1.

Chaka Bil. One and a half mile long and quarter mile wide. Fleet of boats with dust guns ready for action.

Fig. 2.

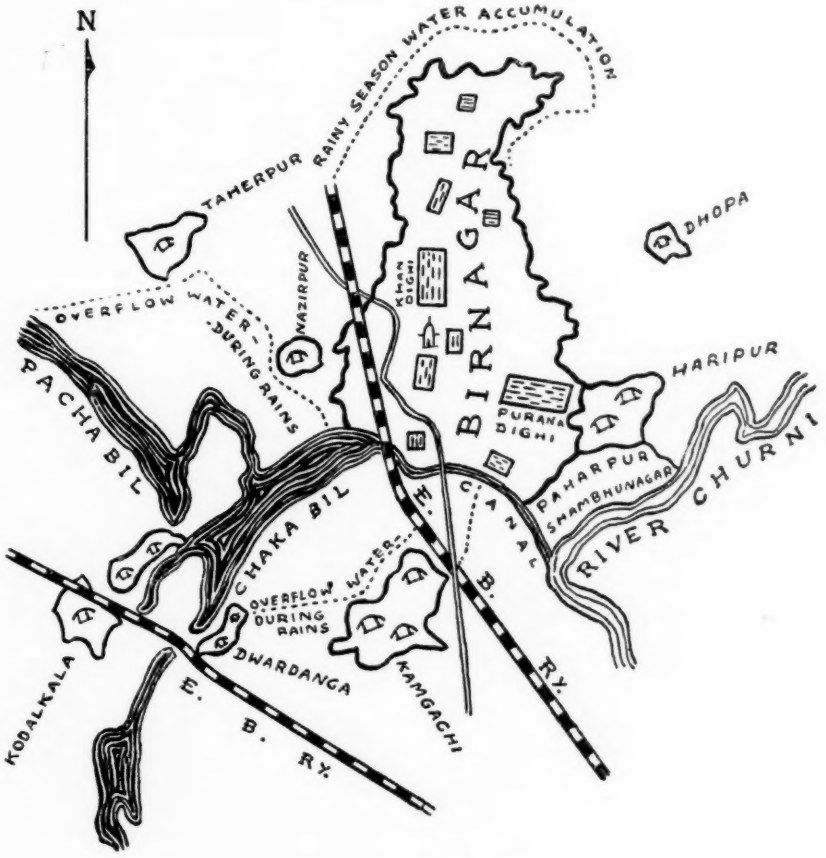
Chaka Bil. A gun in action. One part of Paris green is mixed with nine parts of brick dust for use in wide water areas like this Bil. In smaller water surfaces 5% of Paris green is generally found to be suitable.

centres for larval control in selected villages and urged that the control of rural malaria should be taken up more seriously. By making a special grant to the Birnagar Palli Mandali, Government will merely make a beginning in carrying out one of the most important recommendations of the Commission.

The quinine campaign.

We are grateful to the Director of Public Health, Bengal for supplying us free of cost quinine and cinchona tablets in connection with our malaria control work. It seems to us that the quinine policy of Government requires to be supplemented by the provision of Eu-quinine which should be purchased in the market and issued free to those societies who can make adequate arrangements for its administration by house to house visit. It is now recognised by medical authorities that children under 3 years of age are the worst reservoirs of malarial poison, and it is they who infect most of the Anopheline mosquitoes. We have found it impracticable to administer a bitter drug like quinine to infants even on a small scale. Eu-quinine was introduced last year as an experimental measure and as this drug can be easily administered with a little syrup we were able to treat cent per cent cases in the selected localities with excellent results. There seems little doubt that much of the good work from our quinine campaign is frustrated by leaving the principal gametocyte carriers namely children under 3 years of age untreated. We fully realize the present financial difficulties of Government and we accordingly suggest that a beginning should be made in the free supply of Eu-quinine subject to strict control as mentioned above and that a provision of say Rs. 5,000/- should be made for the purpose. If and when savings are available from anti-malarial budget provision (as happened last year) the money should be utilized in buying this drug which can be kept in stock for use in the following year.

Birnagar and its envirorments. Scale one inch—1 mile.



By courtesy of Director, Malaria Survey of India.

List of Anopheline species prevalent at Birnagar as revealed from our mosquito survey conducted during the period 1927 to 1931.

	Species	*Remarks*
1.	*A. fuliginosus*	
2.	*A. pallidus*	
3.	*A. philippinensis*	
4.	*A. subpictus*	
5.	*A. vagus*	
6.	*A. hyrcanus* var. *nigerrimus*	
7.	*A. aconitus*	
8.	*A. ramsayi*	
9.	*A. barbirostris*	
10.	*A. tessellatus*	Rare. No adult found.
11.	*A. culicifacies*	Rare. One larva was found in 1929, and a few adults were caught in 1930. Not a local species.
12.	*A. macalipalpis* var. *indiensis*	Rare. One adult was caught in a cow-shed in 1930. Identified by Christophers.

The following letter from Lieut.-Colonel J. A. SINTON, V. C., O. B. E., I. M. S. Director, Malaria Survey of India, whose opinion on the Memorandum was sought by the Honorary Secretary was then read :

With reference to your letter of 2nd April enclosing a copy of a Memorandum on the proposed extension of malaria control work at Birnagar.

If a thorough anti-mosquito control has been established in Birnagar Municipality, it seems to me that an extension of this campaign for a radius of ½ mile around this area is a very sound proposition, if money is available.

As your campaign with quinine has failed among children under the age of 3 years, the systematic administration of cu-quinine should have a very beneficial effect on the morbidity, and possibly on the mortality, among children in this age group. On account of its low solubility it must be remembered that its effects may not equal those of quinine in a similar dosage.

I understand from your memorandum that your chief object in using this drug is the elimination of gametocyte carriers. In this connection it must be remembered that the cinchona alkaloids have little or no effect on the gametocytes of *P. Falciparum* which, I believe, is responsible for a large percentage of your cases of malaria. The best gametocyticide at present known for all the species of malaria parasite is plasmoquine, but I do not consider that our present knowledge of this drug for mass administration is sufficient to justify its use under the conditions of your area.

Lieut.-Col. A. D. STEWART agreed with Lieut.-Col. SINTON that the proposed extension of the campaign to a radius of half a mile was necessary. He understood that Chaka Bil, the largest breeding ground of *A. philippinensis*, falls within that limit and should be dealt with. He asked for information whether the Mandali's project for bringing flood water into the Chaka Bil from the River Churni would be beneficial from the agricultural point of view. He stated that if it could be proved that the scheme would be beneficial both from the malarial and from the agricultural points of view he would certainly support it. But this required very careful consideration by experts who should take into account all possible objections that might be raised against the scheme.

As regards the point whether *A. philippinensis* was the only carrier species to be dealt with at Birnagar, he said that there might be some who had doubts about this. He thought that the larval survey beyond the Municipal limits of Birnagar for half a mile should be completed first so as to find out any other possible large breeding grounds of *philippinensis* especially in the rains and a comprehensive scheme prepared on the information obtained. He urged that the Government should start one demonstration centre for larval control rather than scattered ones.

As regards quinine campaign he agreed with Col. SINTON that plasmoquine was the best gametocyticide and suggested to the Director of Public Health, Bengal, the necessity of undertaking experiments with this drug at Birnagar under proper control in connection with malaria work.

A lively discussion took place whether *A. philippinensis* is the principal carrier of malaria at Birnagar. Mr. Bose assured Col. Stewart that the Director, Malaria Survey of India, had no doubt about the infectivity of this species. All the slides containing malarial parasites obtained from the glands of *philippinensis* in 1931 had been confirmed by the Director.

Mr. R. Senior White stated that although he had doubted before whether *A. philippinensis* alone carried malaria at Birnagar he had no hesitation in stating that after what he had seen at Birnagar that day and in the light of Col. Christophers' latest findings that the species which had been hitherto identified as *minimus* var. *varuna* was really *aconitus*, he was convinced that it was the only culprit there. He stated that *A. fuliginosus* the other species in which malarial parasites were found, was a feeble carrier and as such could be disregarded.

He fully supported the proposed extension of the sphere of operation to half a mile, and thought that Government should help the Mandali with increased grant to meet the cost of anti-malarial operation in the extended areas. He urged that Government should start demonstration centres for larval control in selected areas. He was in favour of draining off the water in the Chaka Bil, subject to investigation by experts.

As regards quinine campaign, he was of opinion that the most thorough quinine administration without anti-mosquito measures would be ineffective. He thought that with the medical aid available at Birnagar it would be quite feasible to administer plasmoquine on a large scale without any untoward result.

Dr. S. N. SUR pointed out the necessity of extending the anti-malaria operations to half a mile beyond the municipal area all round. As regards the infectivity of mosquitoes, he said that experimentally it was possible to infect Anopheline mosquitoes other than *philippinensis* such as *fuliginosus* and *pallidus*, but there was no doubt that in nature *philippinensis* has been found the chief culprit in Krishnagar and its neighbourhood. Sporozoites were however found occasionally in *pallidus* and *fuliginosus* and therefore they should be considered as potential carriers.

As regards the administration of plasmoquine, he said that he had seen extensive use of this drug in anti-malarial campaign in Spain without any untoward symptoms and with very good result.

Dr. G. BOSE, agreed with Col. STEWART that economical, agricultural and anti-malarial problems would ultimately be found to be interrelated and interdependent. He thought that if we could devise a scheme which would be acceptable from these three stand-points well and good. But there was no reason why a purely anti-malarial measure without any bearing on agricultural problems should not be initiated if it was at all effective, and malaria control was the end in view. He would go even further and say that Government ought to feel no hesitation in initiating anti-malarial measures even if agricultural interest suffered. The problem of Chaka Bil should be considered purely from the anti-malarial point of view since it proved to be such an important breeding place of *philippinensis*.

Dr. R. B. KHAMBATA said that he was the first to start quinine campaign at Birnagar in 1918. Although his work was not so thorough as that of the Palli Mandali, there was an appreciable reduction in the spleen index. He said that the Chaka Bil scheme had been forwarded to him for opinion and that he had approved of it on account of two reasons : (a) His malaria officer Dr. Sur had said in the report that the Bil bred profusely *A. philippinensis* which was the chief carrier found in nature at Birnagar ; and any scheme which aimed at reducing the number of this mosquito would benefit malaria and (b) this scheme when in operation would raise the sub-soil water in the surrounding area and would beneficially influence agriculture. Mere draining of the Bil would not benefit malaria ; on the contrary it would increase it ; what was really wanted was flooding and flushing of the Bil area during the months of July, August and September, so that water weeds and larvae of *A. philippinensis* both would die out. Whether the levels would permit us to do so, it was for the engineers to say.

The Hon'ble Mr. B. P. SINGH ROY in winding up the discussions said that it was beyond dispute that the Mandali deserved larger financial assistance from Government but extreme financial stringency stood in the way. He had requested the District Magistrate to send him the proposals for the re-excavation of the canal so that he might speak to the Hon'ble member for Irrigation for consideration.

As regards the suggestion about opening of demonstration centres for larval control in selected areas, he said that the matter would be carefully considered by the Public Health Department, and if approved would be included in the anti-malaria programme of Government.

APPENDIX A.

Proposed re-excavation of the Baromesia Canal at Birnagar.

Rai Bahadur A. C. Mitra, B.E., Senior Engineer, Messrs. Martin & Co. and President, Birnagar Palli Mandali, explained with the survey roll the project for the re-excavation of the Baromesia Canal which has been submitted to Government This canal connects the Chaka Bil with the River Churni. The connection between the Chaka Bil and the River Hooghly through the Margangni Canal has ceased to exist owing to the silting of the latter and formation of high ground. It is difficult to restore the original connection between the Churni and the Hooghly through the Canals and the Bil named above, and our project is therefore limited to the re-excavation of the Baromesia Canal for the purpose of controlling mosquito breeding both in Chaka Bil, the largest breeding ground of *A. philippinensis*, the malaria carrier at Birnagar, and in the Baromesia Canal.

It was explained that the effect of the scheme when carried out would be that entire volume of water in the Chaka Bil would be drained off to the Churni at the end of October or the beginning of November when the water level of the Churni would be lower than that of the Bil. Both the canal and the Bil would remain dry during the winter and summer months, and we would save considerable money under headings—larvicides and staff. It was pointed out that *A. philippinensis* breeds throughout the year in the entire surface of the Bil.

It was further stated that when the rains would set in at the end of June or July, water would accumulate in the depression of the Bil but this would flow towards the Churni so long as the water level of the latter did not rise above that of the Bil. The flood water of the Churni usually entered the canal and the Bil either at the end of July or in the beginning of August. It would thus be observed that there would be a flooding and flushing of the Chaka Bil with the silt-laden water of the Churni during August, September and October. From past experience it was found that such movement of the water would be effective in the canal against mosquito breeding, but no marked change was expected in mosquito breeding in the wide area of the bil, so that anti-larval campaign would have to be carried on there for 3 months, instead of for the whole year as at present.

APPENDIX B.

List of exhibits at the Birnagar Malaria Research Laboratory.

(The Laboratory was started in September 1931.)

1. Two microscopes containing slides showing malarial parasites from *A. philippinensis*. Of the two microscopes one was kindly lent for laboratory work by the Public Health

Department, Bengal, and the other (a Zeiss) by the District Health officer, Nadia.

2. A Zeiss Microscope showing a mounted *philippinensis* larva. This was recently purchased by the Birnagar Palli Mandali.

3. A Zeiss Dissecting Microscope showing the salivary glands of *A. philippinensis*. Property of the Mandali. 499 specimens of *A. philippinensis* were dissected under this microscope during September to November 1931.

4. Eleven slides, including the two put under the microscopes, containing malarial parasites from *A. philippinensis*. The dissections were made by Mr. S. Das Gupta and Dr. S. C. Bhattacharji. All these eleven slides with stained sporozoites were confirmed by the Director, Malaria Survey of India. The original correspondence on the subject was laid on the table.

5. Records of collection of *A. philippinensis* showing that it has the habit of frequenting more at night-time than during the day. Krishnagar and Birnagar figures also show that they are found mainly in dwelling houses and rarely in cowsheds.

6. Mounted specimens of Anopheline mosquitoes prevalent at Birnagar The species prevalent are. *A. fuliginosus*. *A. pallidus*, *A. philippinensis*, *A. subpictus*, *A. vagus*, *A. hyrcanus var. nigerrimus*, *A. aconitus*, *A. ramsayi*, *A. barbirostris*, *A. tessellatus* (no adult found), *A. cuticifacies* (rare), *A. maculipalpis* var. *indiensis* (only one adult was caught from a cowshed which was indentified by Christophers).

7. Records of dissection at the Government Malaria Research Laboratory at Krishnagar, which include specimens sent from Birnagar except during 1931. Out of 30,000 Anopheline mosquitoes of all species dissected by Dr. Panchanan Sur, M.B., D.P.H., during the period 1928 to 1931 malarial parasites were found in a systematic manner only in *A. philippinensis* in the fever season as indicated below :

Year.	Aug.	Sep.	Oct.	Nov.	Dec.	Number.
1928	25	88	139	213	74	dissected
	1	4	5	6	0	infected
1929	69	66	86	159	32	dissected
	1	2	2	3	0	infected
1930	6	12	55	66	56	dissected
	0	0	3	2	0	infected
1931	153	146	162	321	243	dissected
	2	10	6	8	3	infected

These figures were kindly supplied by Dr. P. Sur.

8. The infectivity of *A. philippinensis* was corroborated by two workers of the Mandali at the Birnagar Laboratory *vide* items 3 and 4 above and the statement below.

Year.	Sep.	Oct.	Nov.	Number.
1931	73	204	222	dissected
	1	5	5	infected

9. Stray specimens of other species found infected by the Krishnagar Research Laboratory during the period 1928 to 1931 :

Species	Number dissected	Number found infected
A. fuliginosus	8,125	1 from Krishnagar in Feb. 1928.
		1 from Birnagar in Dec. 1928.
A. pallidus	4,128	1 from Birnagar in Aug. 1929.

N. B.—*A. philippinensis* and *A. pallidus* were separated from *A. fuliginosus* at the Krishnagar Laboratory at the end of the year 1927. Before that all these three species were merged under *A. fuliginosus* and shown as such.

10. Mounted specimens of *A. aconitus* collected at Birnagar. Different specimens of this species were examined by Christophers who expressed the opinion that these *minimus*-like forms were *aconitus* and not *minimus* var. *varuna* under which nomenclature they had been previously recorded. He writes : "It is clear that the condition at the base of vein 3 and the number of dark spots on vein 6 are liable to variation and cannot be used critically in identification of this form. Your specimens are not *A. varuna* because all but three have a fringe spot at vein 6 and in those three if I remember correctly the 6th vein has 3 dark areas. Further in all but one which otherwise conforms to *A. aconitus* the apical half of the proboscis is much more distinctly pale than is generally seen in *A. varuna*. Further in all the first branch of vein 5 has a pale spot whereas in *A. varuna* this is practically always dark". In view of this decision there is no room for doubt that there is neither any *minimus* nor *minimus* var. *varuna* at Birnagar.

11. Mounted specimens of *A. minimus*, *A listoni*, and *A. varuna*. These were kindly supplied by Col. Sir S. R. Christophers from other parts of India for study and comparison at our Laboratory. None of these species are prevalent at Birnagar.

12. Habits of Anopheline species at Birnagar. These have been gathered from our collection of mosquitoes from dwelling houses and cow-sheds and of larvae from various kinds of water collections. The records of the Krishnagar Laboratory were also consulted. The conclusions are provisional—

A. philippinensis ... Mainly feed on human blood.
A. aconitus ... Mainly feed on bovine blood.
A. hyrcanus var *nigerrimus*, *A. barbirostries*, *A. tessellatus* ...Like neither human nor cow's blood.
A. fuliginosus, *A. pallidus*, *A. ramsayi*, *A. subpictus*, *A vagus* ...Suck both human and cow's blood without discrimination.

13. Plates showing eggs of certain Anopheline mosquitoes of Birnagar. These have been described in an article entitled "The eggs of Indian Anophelines" by Colonel Sir S. R. Christophers, a copy of which was placed on the table. Live mosquitoes were supplied in Barraud's cages to the Malaria Survey of India at Kasauli for the purpose of egg-laying. These travelled 1200 miles and about 40% survived the journey, a satisfactory record.

14. Publications of the Mandali. All these have been written by Mr. K. Bose, Honorary Secretary to the Mandali.

(1) Report on Mosquito Control at Birnagar, 1924 and 1925. Calcutta Medical Journal, November 1925.

(2) Malaria Control at Birnagar, 1926. Calcutta Medical Journal, January 1927.

(3) Malaria Control at Birnagar, 1927. Calcutta Medical Journal, December 1927.

(4) Malaria Control at Birnagar, 1928-29 with the proceedings of a Conference at Birnagar presided over by Sir Malcolm Watson. Indian Medical Gazette, Vol. LXIV, No. 6, June 1931.

(5) Mosquito Survey at Birnagar. Records Malaria Survey India. Vol. II, No. 2, June 1931.

(6) Application and Use of Larvicides. Indian Medical Gazette, Vol. LXVI. No. 8, August 1931.

(7) The Problem of Malaria in Bengal with particular reference to Birnagar. Journal Indian Medical Association, December 1931.

(8) Confirmation of *Anopheles philippinensis* as a Malaria Carrier in Bengal, Records Malaria Survey India Vol III, No. I, June 1932.

Correspondence

[The Editor is not responsible for the views expressed by correspondents]

Bilivaccine

Sir,

About two years ago, probably September 1930, when there was more than one case of typhoid in the neighbourhood, a whole family consisting of more than a dozen members between the ages of 3 and 60 took bilivaccine under my instruction, and none of them, it may be incidentally noted, had either diarrhoea or anything else unusual. One of them, a strong youngman of 23 was, however, attacked with fever in July last.

I examined the case on the 5th day of the disease and found the pulse to be much slower in relation to temperature. The case was provisionally diagnosed to be enteric but no blood examination was made. Clinically all the symptoms of enteric developed, one by one, as the disease progressed although the symptoms were all mild. The pulse remained slow till the middle of the 2nd week, the typical bronchial catarrh with cough developed in the 2nd week, there was gurgling in the right iliac fossa from the latter part of the second week and the fever lasted for about 26 days, with an average temperature ranging from 100 to 102·6 degrees. A rash developed on the skin towards the latter part of the first week but as the patient was a Bengali of somewhat dark complexion, the rash could not be seen distinctly.

DR. S. BHATTACHERJI M.D. of Calcutta School of Tropical Medicine and DR. D. N. MUKERJI, formerly Teacher Government Medical School, Cuttack, were called in as consultants and both of them confirmed my diagnosis. All the members of the patient's family, consisting of a dozen, between the age of 5 and 62 again took Bilivaccine, and none of them suffered from diarrhoea or any other untoward symptom.

The mild symptoms of the case noted above were probably due to the previous administration of Bilivaccine. One of the consultants has not in his experience seen a single case terminating fatally within 3 or 4 years after taking Bilivaccine. As to whether Bilivaccine causes diarrhoea or any other untoward symptom, I think after examining 40 to 50 cases that it does not.

May I now appeal to the medical profession of Calcutta to let the public know how far Bilivaccine prevents or makes mild an attack of enteric ? I am sure a distinct service will thereby be rendered to humanity as enteric, a much-dreaded scourge of our town, is taking a heavier toll year after year and anything to combat it will be a great boon.—I am etc.

Amal Chandra Ganguli, M. B., D. T. M., D. P. H.
58, Hinduston Park, Ballygunj, Calcutta.

Medical Associations, Societies, etc.

Medical Societies, Associations, Unions etc. are invited to make use of this Section of the Journal. —EDITOR

Delhi Medical Association.

ANNUAL REPORT, 1931-32.

There were 109 members on the roll at the end of the year out of which 26 were ladies.

There were 10 ordinary monthly general meetings, 13 meetings of the Managing Committee, the Annual Dinner and an At Home party in honour of Prof. HIRSCHFELD of BERLIN. The Annual excursion party did not materialize owing to lack of proper response.

The Secretary regrets that his attempts to hold more scientific discourses have not borne much fruit. Inspite of repeated requests only a few came forward to read papers. Apart from this, another difficulty was that in summer months attendance is generally meagre and consequently those intending to read papers do not feel inclined to read these before a thin house. Whereas in winter months the agenda is usually full of Medico-Political items which take up most of its time. Inspite of these difficulties the following scientific discourses were held :

Prevalence of Tuberculosis in Delhi City—its causes and remedies ; Experience in Mayo Clinic for 5 years, Common surgical mistakes as experienced in practice ; Sex Pathology ; Endocrine in general practice.

The greatest achievement of the year for the Association has been the establishment and running of a charitable Venereal Clinic named

Health Centre for Men under the auspices of the Association and for this the best thanks are due to the Delhi Health and Social Service Union, which body financed the Centre.

The Association has this year succeeded in securing a seat in the Court of Delhi University. It has been this year asked to send representatives to the Tuberculosis Sub-Committee of Red Cross Society. Attempts are being made to secure representation in Municipal Committees.

The Association subscribed to nine medical journals during the year—two being in duplicate to meet the demands of the readers.

The Association has got a plot of land of its own and a plan of the building has been submitted to the Deputy Commissioner for sanction.

All-India Medical Licentiates' Association.

FATEHGARH BRANCH.

The following resolution was passed at a meeting held on July 20, 1932 :

"The Fatehgarh branch of All-India Medical Licentiates' Association offers its heart-felt congratulations to DR. INDRA NARAYAN SAXENA a real worker of the association on his election to the U. P. Medical council as a representative of an important section of the independent medical profession of the province. The branch considers his success at the election as the success of the cause for which the independent medical profession stands, and it is hoped that DR. INDRA NARAYAN SAXENA will make efforts to safeguard the interests of the profession in general and so demean himself as to fully justify the confidence placed in him by the members of his constituency."

LYALLPUR BRANCH.

The following resolutions was passed on the 3rd July, 1932.

1. This meeting condemns the Indian Medical Council Bill as introduced in the Indian Legislative Assembly on the 23rd March, 1931, as a breach of faith committed by the Government of India with the Medical Profession of India, in as much as it differs radically both in principle and in details from the Bill which was circulated by the Government for professional opinion on the 31st Ausust, 1931 ; besides it intends to divide the noble professsion of medicine into two sections permanently by providing a "Register of higher grade of practitioners" only and as such is absolutely unacceptable to the profession, whose unanimous demands for its amendment have been flouted. This meeting appeals to the Members of the Indian Legislative Assembly and of the Council of State to refuse permission for the first reading of the Bill.

2. This meeting hopes that all Medical Associations in India will realise the breach of faith commited by the Government of India with the profession, and will take necessary action in the matter, and in particular, will individually canvass votes of the members of either Legislature residing in their Provinces in favour of rejecting the Bill before its first reading.

The Mysore Medical Association.

Following resolutions of the Central Branch of the Mysore Medical Association were passed at its meeting held at Victoria Hospital, on Monday the 14th March 1932, on the subject of reduced scale of fees for Medical examination, offered by the Oriental and the Empire of India Life Insurance Companies :

1. Resolved that the members of the Association do not accept the lower scale of medical fees recently offered by the Oriental and Empire of India Life Insurance Companies to their medical examiners.
2. That the Executive of the Association do take all necessary measures to safeguard the interests of the members in this matter.
3. That these resolutions with the relevant discussion be communicated to all members of the Association.

Tanuku Medical Association.

The following resolutions were passed at a meeting held early in August :

1. This Association heartily supports the resolutions suggesting the improvement of the standard of L.M.P. etc. passed at a meeting at Madras by the public under the presidency of the Chief Minister under the auspices of the Madras branch of the All-India Medical Licentiates' Association held on July 18th 1932.

2. (*i*) This Association welcomes the announcement of the Chief Minister to appoint a Committee to examine the system of honorary medical service and suggests that this Committee shall have at least one representative from the Andhra Medical practitioners elected by them.

(*ii*) In case election is not feasible, he must be one selected from the muffusil Districts.

3. This Association is of opinion that the committee on the honoray medical system

should recommend and define clearly the various duties especially of the honorary clinical assistant, and assistant Surgeon.

4. This Association feels that the raising of the minimum standard of L.M.P. examination from 33% to 50% should be gradual and should not affect the present batches of students, for, as in the opinion of this Association neither the teachers who coach the students nor the students who appear for the examination, will all be prepared for such an abrupt rise in their standard.

5. This Association congratulates DR. P. M. KOSHI, professor of Anatomy in the Madras Medical College, on his being awarded the F.R.C.P. Diploma by the Royal College of Physicians of Cambridge, he being the first South Indian to get it.

6. This Association places on record the valuable services rendered by DR. RAO SAHEB M. SESHADRI REDDI, L.M.S. aud DR. MISS R. MATHEW as members of this Association.

Medical Profession in Amraoti.

The following resolutions was passed at a meeting of the Medical Profession of Amraoti held on 18th August, 1932.

This meeting of the members of the Medical Profession in Amraoti condemns the Indian Medical Council Bill as introduced in the Indian Legislative Assembly on 23rd March, 1932, as a breach of faith committed by the Government of India, inasmuch as it differs radically both in principle and in details from the bill which was circulated by the Government for professional opinion on 23rd August, 1931 and is absolutely unacceptable to the profession, whose unanimous demands for its amendment have been flouted. This meeting appeals to the members of both the Houses of Indian Legislature to oppose the bill as introduced and press for amendments and modifications suggested by the Medical Council Bill Committee appointed by the Bombay Medical Association and the Committee of the All-India Medical Association, Calcutta.

Association Notes.

Multan Branch.

A meeting of the Multan Branch of Indian Medical Association was held on the 27th August 1932 and the following office-bearers for the year 1932-33 were elected unanimously :

1. *President* - Captain H. CHANDRA I.M.S.
2. *Vice-President*—DR. DEWAN CHAND SONI, L.M.S.
3. *Secretary*— DR. DIWAN CHAND BHUTANI, M.B., B.S.
4. *Jt. Secretary*— DR.GYAN SING, D.P.H. etc. Health Officer.
5. *Treusurer*— DR. MAQBVL AHMAD,

Birbhum Medical Association.

Affiliated to the I. M A.

The usual monthlv meeting was held on 3rd July, 1932 when DR. B. DAS, M.B., read an interesting and learned paper on "Blindness."

The following resolutions were passed :

1. In view of the appalling figures of blindness due to various preventible eye-diseases in the district, resolved that the authorities of the Birbhum District Board and Suri Municipality be requested to open a charitable Eye clinic for the treatment of all eye cases and at the same time to afford facilities for training the Medical Officers of the various dispensaries in the district in the modern methods of prophylaxis and treatment of eye diseases.

2. In view of the fact that malaria played havoc in the town during last two consecutive years and the time is coming near when there is an apprehension of the same, it is resolved that the Municipal authorities be requested to take immediate steps and prevent the appearance of the same as far as possible. In doing so, attention is drawn of the Municipal authorities to the filthy tanks, unused wells, and proper flushing of drains etc., of various quarters of the city. Free distribution of quinine for prophylaxis is suggested as an early measure.

At the conclusion of the meeting the guests were entertained with light refreshments.

Current Medical Literature

Renal Insufficiency in Essential Hypertension

L. G. BELL (Canadian Med. Assoc. Jour. May, 1932) bases his paper on studies of autopsy material obtained from 52 cases dying of hypertension. The author found the kidneys to be involved in every instance though only 9 cases showed evidences of renal insufficiency in life. In the great majority of cases of essential hypertension, death occurs from cardiac failure or cerebral vascular accident. Death from uraemia occurs only in a small percentage of cases probably in 13%. The cases which develop renal insufficiency are usually of the following two types.

(1) Benign nephrosclerosis, where there is a gradual obliteration of the renal parenchyma due to arteriolosclerosis.

(2) Malignant nephrosclerosis.—where the clinical course is rapidly fatal due to necrosis of afferent arterioles of the kidney.

The essential difference between the two types is probably one of time.

Some cases show grades of severity intermediate between the benign and malignant forms. *J. C. B*

Diet in Bright's Diseases.

J. S. MC. LESTER (Jour. Amer. Med. Assoc. Vol. 99, No. 3 p. 192) reports that formerly in treating this disease physicians thought only of the kidey, protein catabolism and of the harmful effects of its endproducts. Now attention is directed to the anabolic influences of protein, its upbuilding effects and beneficial influence on repair-processes and the patient is allowed liberal amounts of essential foodstuffs.

In Bright's disease in its acute hoemorrhagic and degenerative types there is marked loss of body protein either from bacterial invasion or from toxin and this deficit upsets the water balance. The author maintains that deposit protein and that used for replacement of wear and tear make no demand on the excretory organs and this fact applies to the large part of the protein eaten by any person who has suffered from protein shortage. MC CANN reported of a young boy with acute haemorrhagic nephritis whose disease had reached a stationary stage but when the protein allowance was increased from from 75 gms. to 150 gms. he showed immediate and marked improvement.

The author concludes that patients with this disease can with relative impunity be given liberal protein diet and that such a diet facilitates recovery. He recommends carbohydrate up to 50% of the total caloric requirement and about 150 gms. of protein daily derived form milk, eggs and meat. This need for liberal protein intake is imperative. Except in terminal stages with low urea-excretion there is no reason for restricting proteins. In Nephrosclerosis due to essential hypertension, the diet should be fairly liberal and 75 to 100 gms. of protein ore enough. *J. N. D.*

Hyper-Cholesterolaemia in Experimental Anaemias.

E. CHAMERLAIN and R. L. CORLETT (British Jour. of Experimental Path. Ang. 1932, Vol. XIII, No. 4) studied the variations in blood and plasma-cholesterol contents in cases of anaemia produced experimentally by—

(a) bleeding

(b) phenyl-hydrazine hydrochloride injections given sub-cutaneously and arrived at the following conclusions :

(1) In nearly all cases of anaemias from bleeding there was an initial fall of both blood and plasma cholesterol which they explain as being due to blood dilution.

(2) There was a secondary rise of both blood and plasma cholesterol in cases. of anaemia produced by bleeding over several days. This was explained as a result of the general lipaemia which was brought about by a process of mobilisation of the cholesterol from the supra-renal glands.

Similiar initial hyper-cholesterolaemia followed by a secondary rise occured also in anaemia produced by phenyl-hydrazine hydrochloride injections. *J. N. D.*

Haemophilia in Infancy and Childhood.

N. Kugelmass (Amer Jour. of diseases of children, July, 1932 p. 50) formulates the following criteria necessary for diagnosis :—

(1) Hereditary in origin.

The disease is transmitted through the females to the males from generation to generation, as a recessive sex character linked to a single male chromosome according to the laws of Mendelian inheritance. The female conductor transmits the condition to about two thirds of her offspring and the rest are not conductors.

(2) The disease is limited to males, from infancy to early manhood. All the cases of alleged haemophilia among females reported in the literature did not fulfil the necessary and sufficient criteria for the diagnosis of this disease.

(3) Tendency to repeated bleeding, spon taneous or traumatic, from several sites e. g- nose, gums and into the joints.

(4) Prolonged clotting time and normal bleeding time.—

Haemophilic blood shows a markedly low prothrombin content but a high antithrombin content. The platelets, though normal in number, are physiologically defective, having a slow rate of disintegration.

(5) Haemophilic blood has a blood-clotting index that is less than 1/10th of the normal. The index is the ratio of the concentration of the substances tending to favour clotting (e.g. prothrombin, fibrinogen, and platelets), to the substance tending to favour bleeding e.g. antithrombin. Thus the normal index of clotting function is 0'5, whereas the haemophilic clotting index is less then 0·05. This very low index of blood-clotting is the diagnostic feature of haemophilia.

(6) The Index of blood-clotting function is remarkably increased after blood-transfusion, though the improvement lasts only for 48 hrs. Blood-transfusion, however, has no effect on the clotting function of the blood in the haemophilic subjects with joint-manifestations.

(7) Diets rich in proteins, vitamins, lipoids and in minerals do not improve the deficient clotting function in haemophilia.

(8) Haemophilic persons show the absence of the female sexhormone in their tissues, which is present in normal males. Injections of ovarian extracts or theelin do not influence the clotting mechanism in haemophilia.

(9) Injection of serum or its local application has no effect in checking the haemorrhage of haemophilia, unless it is fresh and rich in thrombin.

It must be noted, however, that non-haemophilic bleeders respond readily to any serum and to dietary protein-therapy. *J. C. B.*

Orthodiagram of the heart as measure of the size of heart in children.

A. F. HECHT, (Jahrb. F. Kinderh 133 : 26 Sept. 1932) as a result of his studies of a large series of normal and pathological cases of children, concludes that 100 times the area of the cardiac shadow in sqare centimeters divided by the two thirds power of the weight of the child in kilograms, will give the index of the size of the heart. As for example, if the weight in kilograms of a child be 27, and the area of the cardiac shadow is 63 squarc centimenters then the index of the heart-size is $\frac{100 \times 63}{\text{two-third power of } 27} = \frac{100 \times 63}{9} = 700.$

He also points out that children with a history of rheumatism but without cardiac involvement, have small hearts, As the child grows, the heart becoms relatively smaller. After infections, the heart may remain enlarged as long as a year. *J. C. B.*

Hyper-Vitaminosis D and Arteriosclerosis.

H. L. VANDERVEER, (Arch Path. 12; 941, Dec. 1931) carried on experimental studies on 24 healthy young rabbits of 3 months to 1 yr. old, by giving bi-weekly subcutaneous injections of Viosterol with a Vitamin D potency 10,000 times that of good cod liver oil. The dosage used for the 1 year old rabbits was 0'5 cc. per kilogram and that for younger rabbits was reduced proportionately. Experiments were carried on till the animals died spontaneously. As a result of macroscopic and microscopic observations of the autopsy materials, the following facts were recorded :

(1) Calcareous deposits were found, in the early stage, about the elastic fibres of the media of the blood vessels. Later on, medial degeneration occurred. This arterial change, however, was not specific for Vitamin D. It resembled that produced by adrenal hydrochloride, barium chloride and digitalin.

(2) Other organs also showed calcareous deposits e. g. kidneys, stomach, heart, liver and lungs., the toxic degeneration of the tissues preceded calcification of the organs.

The bone-marrow and the parathyroid glands showed no such changes as are common in hyperparathyroidism. *J. C. B.*

Congenital Pulmonary Atresia.

M. A. KEEGED, (Amer. Heart Jour. 7 : 263, Dec. 1931) reports the case of one infant 6 months old in whom there was a history of dyspnoea and increasing cyanosis, with a rough systolic murmur at the base. The second case was a 3 months old infant with history of cyanosis since birth and clubbing of the fingers but without any murmur. The skiagrams were, both atypical and they showed an enlargement of the cardiac shadow upward and to the right.

Complete autopsy reports are given with discussion and bibliography. *J. C. B.*

Diphtheria.

W. T. BERSON, (Practitioner, 128 : 47 Jan. 1932) deals briefly with the early history of diphtheria with a clear-cut description of etiology, pathology and symptomatology. Under complications, he points out that the diphtheritic paralysis occurs in 10-20% acording to the severity of the attack. The palatal paralysis is the commonest variety and it occurs early. Cardiac failure may occur within a few days of the onset or any time upto the second or third week. The disease has to be differentiated from Vincent's Angina, follicular tonsillitis, measles and scarlet fever.

The diagnosis of diphtheria rests primarily

with the clinician. Too much importance should not be attached to the negative bacteriological findings. The prognosis depends on early diagnosis and efficient treatment with antidiphtheritic sera. The dosage varies in mildest cases from 2,000 untis to 50,000 units in severely toxic cases. Some authorities would even advocate in malignant forms as much as 300,000 units. Unless, there is gross toxaemia or laryngeal involvement, the intra-muscular route of administration esp. in the lateral aspect of the thigh is preferable. Rest in bed, which, in mildest cases, should be 10 days, must be prolonged to a minimum of 6 weeks in a severe case. Trained nursing is essential in all except the mildest cases. The author emphasises that the treatment of laryngeal diphtheria is a matter for the specialist who is expert in aspiration, intubation and tracheotomy. Lastly he discusses the question of carriers and their treatment. *J. C. B.*

The Treatment of Whooping Cough.

A. J. TURNER, (Practitioner 128 : 66, Jan. 1932) points out that the use of Bordet-Gengou vaccine or the use of intra-muscular injections of ether has not been successful enough to warrant the general use of either.

He used ultra-violet irradiation in his cases of pertussis over a three year period and obtained the same uniform success as reported by E. H. and W. K. Russell.

The details of the author's technique of irradiation are : "The entire body is exposed to the U. V. rays at a distance sf 36 inches, the patient lying down, first on the back and then prone. The exposure was made once a day until the disappearance of principal symptoms and then twice a week for 1-2weeks. The first dose varied with the age of the child from ½-2 mins. both to back and front. Each day the dose was increased, in the youngest by half a minute each day, in older ones by one minute each day.

The large doses are deprecated by the author. Pigmentation should not be produced in the skin, because it hinders the passage of the rays under such a method of treatment, the symptoms disappeared and the patients were apparently cured on average in 20 days. *J. C. B.*

The treatment of neurosyphilis.

H. C. SOLOMON divides cases of neurosyphilis artificially into a number of groups on the basis of either clinical symptomatology, pathology, serological findings or response to treatment. According to the author, the treatment of general paresis by courses of Arsphenamin, Bismuth, Mercury and Iodide have practically no value in the treatment, nor does intraspinal therapy appreciably increase the effectiveness of the treatment. The author further concludes from a series of cases that the most satisfactory results are obtained by a combined treatmemt of tryparsamide and Fever. The fever might be induced by Malaria or Diathermy.

In tabetic cases, tryparsamide would seem to be the best method of treating the majority of cases. Where this is not sufficiently effective or where there are contraindications, intraspinal therapy has a high potency and in majority of cases, there are both clinical improvement and serological cure.

The treatment of the meningeal type of neurosyphilis is simple and satisfying. In both the early and late varieties of this disorder, Tryparsamide may be expected to give a serological cure in almost every case and acts almost as a specific drug. According to the author Fever treatment is rarely necessary.

The diagnosis of neurosyphilis is simple. Majority of cases develop severe nervous system lesions, show abnormalities in the cerebrospinal fluid from the very early stages of syphilis. *J. N. D.*

Radiology in diseases of the lungs.

Stanley Melville (B.M.J. Aug. 13, 1932, p. 283.) writes that the value of Radiology in the diagnosis of lung diseases has now come into supreme importance.

In pulmonary tuberculosis definite infiltrations can be demonstrated upon on X-ray film at quite an early stage of the disease, and frequently before definite physical signs are present.

Consistently negative X-ray evidence extending over a period of some months may be taken as conclusive proof of the non-existence of pulmonary tuberculosis.

In cases in which physical signs are present, it may be assumed that the intial stage has passed, and in such cases, the X-ray picture will, as a rule, show much more extensive disease than can be demonstrated by physical examination.

The author believes that the Tubercle bacilli gain an entrance into tho lungs by aspiration in the vast majority of cases and accordingly, any further invasion in the adult is of the nature of exogenous reinfection.

In the infant, the incidence of pulmonary tuberculosis would seem to depend on the initial dosage and the degree of resistance. If the dose be great and the resistance low, then we get an acute caseous bronchopneumonia (infantile phthisis), so rapid and so fatal as to be practically hopeless from the onset. If the dose is small and the resistance good, then the usual course is for the infant to get a primary lung focus in the lymphoid tissue found in the region of the smaller bronchi with resulting response in the tracheobronchial glands. The small focus may be situated in any part of lung parenchyma and in

due course clears up and may even entirely disappear or it may be revealed as a calcified nodule. The bronchial glands calcify in similar fashion. The glands may at times also undergo caseation and burst either into a bronchus or into a blood vessel and we get an aspiration infection in the case of bronchus or a miliary tuberculosis in the case of the blood vessel. Finally there might be a reaction in the area of a tuberculous gland in the mediastinum. It may be evanascent, disappearing within a few days or it may be persistent or even recurrent. Clinical evidence may be slight but there is usually some pyrexia and general malaise and the infant reacts positively to tuberculin and this the author suggests to be an evidence of local infection and not of an active lesion. The X-ray evidence is definite and shows an area, usually wedge shaped, extending in any direction from the inflamed gland into the surrounding tissues. After a variable period the local area disappears entirely. According to the author the calling of such a condition as pulmonary tuberculosis is wrong. *J. N. D.*

Measles and Cuti-reaction for Tuberculosis.

P. Lereboullet and P. Baize, (Arch. de Med, d. enf. 34 : 701 Dec., 1931.) point out that Pirquet and Preisich in 1907, showed that children suffering from measles lost temporarily the power to react to tuberculin, at the onset of the disease. The reaction remains negative for about one week and then reappears. Mantoux and Harviers' intra-dermal method showed the same results. Pirquet's suggested explanation is as follows :—The positive cuti-reaction in tuberculous subjects depends on the presence of an allergic state. But on the occurrence of measles in tuberculous children, there is a temporary diminution or even complete suppression of allergy and a state of anergy or increased receptivity to tuberculous infection follows. Thus, measles has been supposed, for a long time, to favour dissemination of tuberculosis. Recent authors e. g. Debre and his associates do not confirm this view. They explain the disappearance of the cutireaction to be a purely cutaneous response in the presence of the measly eruptions. Inspite of all these divergent opinions, it is agreed that measles aggravates an old and latent tuberculous focus. The present writers made a study of the cutireaction in course of measles, in 98 patients. In 16 of these, the cuti-reaction was positive before the onset of measles and it disappeared either suddenly or gradually in 14 of them, after the onset of the disease. Only 2 failed to lose the reaction even toward the thirteenth day after exposure. The cutireaction re-appeared again in 15-16 days after the onset of the eruption. From a follow up of 75 cases for a year they found only 1 case where the old tuberculous focus was aggravated, and 2 cases, one of caseous bronchopneumonia and the other of tuberculous meningitis, both of which proved fatal. *J. C. B.*

Digitalis in Auricular Fibriliation.

E. P. Boas, (Amer. Heart. Jour. 6788 Aug. 1931) says that it is an accepted opinion that children require digitalis in doses higher than those of adults. In presence of fever, digitalis, to be of any use, must be administered in sufficiently large doses. The weight of the patient is not a reliable guide to the requisite total dose of digitalis. When the patient has not previously received any digitalis, the weight may serve as a guide for the initial dosage. But the maintenance dose must be found out by trial in each case. Generally, the greater the original dose required to slow the Ventricles, the larger will be the maintenance dose, The essentials of successful therapy are strict individualisation and efficient dosage. *J. C. B.*

Essential Hypertension.

F. D. Murphy, J. Grill, B. Pessin & G. Moxon (Annals of Int. Med. Vol. VI, No. 1, July 1932) from a study of three hundred and seventy five cases of essential hypertension with post mortem examinations in all, summarise as follows :

(1) The cases are divided for convenience of study into three stages : functional, arteriosclertic and arteriolonecrotic.

(2) Retinal changes were observed typical of various stages.

(3) Arteriosclerosis and necrosis of blood vessels of involved organs.

(4) Unifying features of all stages are hypertension, cardiac hypertrophy and arteriosclerosis. The chief complications are apoplexy, heart failure and renalfailure. Arteriosclerosis of the renal vessels is a constant and characteristic feature of essential hypertension at autopsy. Particular attention is given to the syndrome of so-called malignant hypertension.

(5) Histologically the principal lesion is an arteriosclerosis, the wide variety of symptoms and signs appears to depend upon the extensiveness. the rate of progress, the severity and the location of the arteriosclerosis.

(6) The clinical and histological observations on group 3 (so called malignant hypertension) differ from those of group 2 (benign) only in degree. All of the symptoms and histological lesions observed are believed by the authors to be produced by Arteriosclerosis alone. *J. C. B.*

Erythroedema or Pink disease.

George Willcocks, (Practitioner, 128 : 78, Jan., 1932) deals with the important signs and symptoms of the disease, which he has observed

in his series of 42 cases. According to him, the characteristic features are : pink feet and hands, irritability, restlessness, sleeplessness, photophobia, oedema of the feet and hypotonia. The pink condition of the feet is the only pathognomonic sign. The duration of the illness in his series varied from 3-30 weeks. The diagnosis of the disease. however, should be made from an assessment of all symptoms and signs and their persistence without any discoverable cause. The prognosis is serious, if complications supervene. Recovery, when it takes place, is usually complete. A balanced diet and eradicatiou of septic foci are the only important methods of treatment. Drugs are of no use except to relieve symptoms as they arise. *J. C. B.*

Tonic pupils and absent tendon reflexes.

W. J. ADIE, (British Jour. of Ophthal. 460, Aug. 1932) points out that the disorder characterised by tonic pupils and absent tendon reflexes has several clinical manifestations which can be conveniently grouped under complete and incomplete forms. The complete form is characterised by :

(*a*) Presence of tonic convergence reaction in a pupil apparently inactive to light.

(*b*) Absence or diminution of one or more of the tendon reflexes of the lower limbs.

The incomplete forms present the following :

1. Tonic pupils alone.

2. Atypical phases of the tonic pupil alone.

3. Atypical phases of the tonic pupil with absent tendon reflexes.

4. Absent tendon reflexes alone.

In the atypical phases, reactions are absent or difficult to detect. Most of the cases of unexplained ophthalmoplegia interna, ophthalmoplegia interna unilaterale, iridoplegia and partial iridoplegia are probably examples of an incomplete form of this disorder. No morbid factor, hereditary or acquired, plays any role in the etiology of this disorder. Syphilis has nothing to do with it. Its course is benign and it is compatible with long life. *J. C. B.*

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